DOCUMENT RESUME

ED 301 669	CE 051 405
TITLE	Natural Resources Management: Task Analyses. Competency-Based Education.
INSTITUTION	Henrico County Public Schools, Glen Allen, VA. Virginia Vocational Curriculum Center.; James Madison Univ., Harrisonburg, Va.
SPONS AGENCY	Virginia State Dept. of Education, Richmond. Div. of Vocational and Adult Education.
PUB DATE	85
GRANT	131-79-2
NOTE	630p.; For related documents, see ED 300 574 and CE 051 407.
AVAILABLE FROM	Virginia Vocational Curriculum and Resource Center, 2200 Mountain Road, Glen Allen, VA 23060-2208 ($35.01).
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE	MF03 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Agricultural Education; *Behavioral Objectives; Community Colleges; Competency Based Education; *Course Content; Criterion Referenced Tests; *Job Skills; Learning Activities; *Natural Resources; Postsecondary Education; *Task Analysis

ABSTRACT

This task analysis guide is intended to help teachers and administrators develop instructional materials and implement competency-based education for natural resources management courses in the agricultural resources program. Section 1 contains a validated task inventory for natural resources management. For each task, applicable information pertaining to performance and enabling objectives, criterion-referenced measures, and suggested instructional activities and aids is provided. In this section, tasks are arranged by worker content/concept areas only, and no attempt is made to sequence tasks in instructional order. Section 2 provides a description of the natural resources management programs and courses that incorporate natural resources management. These materials follow: a description of the courses, a task sequence list that provides a suggested order of the task inventory for the actual course instruction, and a course content outline. The instructional topics within the course content outline have been cross-referenced with corresponding task/competency codes from the task inventory in Section 1. Appendixes include listings of books and selected teaching materials, audiovisual materials, publishers' addresses, and additional equipment and tools. (YLB)

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Natural Resources Management:

Task Analyses

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Commonwealth of Virginia
Department of Education
Divisions of Vocational and Adult Education
Richmond, Virginia 23216

1985

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Review Draft

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COMPETENCY-BASED
CBE
EDUCATION

GUIDE APPLICATION

This guide is based on the following representative Dictionary of Occupation Titles (DOT) job titles contained in the occupational domain of NATURAL RESOURCES MANAGEMENT.

DOT Job Title	DOT Code
Soil conservationist	040.061-054
Groundskeeper, parks and recreation	406.687-010
Fish hatchery worker	446.684-010
Christmas tree farm worker	451.687-010
Forester aide	452.364-010
Forest worker	452.687-010
Tree planter	452.687-018
All-round logger	454.684-018
Survey helper	869.567-010

Therefore the guide is useful in developing instructional material and implementing competency-based education for the following programs and courses:

Program	Courses
Agricultural Resources	Natural Resources Management III (8040)
	Natural Resources Management IV (8042)
(CIP CODE: 03.0101)	Natural Resources Management V (8044)

Virginia Community College System (VCCS) courses which are related to the occupational domain and job titles contained in this guide are listed in Section 2.

Additional information concerning the application and use of this guide in program planning and development should be addressed to:

ASSOCIATE DIRECTOR
AGRICULTURAL EDUCATION
DEPARTMENT OF EDUCATION
RICHMOND, VIRGINIA 23216

Task Analyses

for

Natural Resources Management

Produced by

James Madison University
Harrisonburg, Virginia

and

Virginia Vocational Curriculum Center
Department of Vocational and Community Education
Henrico County Public Schools
Glen Allen, Virginia 23060

in cooperation with

Agricultural Education Service
Department of Education
Vocational and Adult Education
Richmond, Virginia 23216

This task analyses was developed for the Virginia Department of Education, Vocational and Adult Education, under the provision of an Articulation Project Grant #131-79-2 awarded to James Madison University.

1985

FOREWORD

In the next decade, businesses and industries in Virginia will require large numbers of skilled workers. Therefore, vocational education at the secondary and postsecondary levels will have the responsibility of preparing individuals for a variety of occupations.

Competency-based education (CBE) provides the preparation students need for entry into the Virginia work force. The CBE practice of recording competencies developed by students helps them to make a smooth transition between secondary and postsecondary programs when both levels of education are required for career training. In addition, CBE is effective in retraining workers who have been displaced because of changing technology.

This guide will assist teachers and administrators in developing instructional materials that meet the needs of students and industry and comply with the Virginia CBE standards for vocational and adult education.

S. John Davis
Superintendent of Public Instruction

Melvin H. Garner
Administrative Director
Vocational and Adult Education

ACKNOWLEDGMENTS

The development and completion of this guide required a vast expenditure of time, effort, and teamwork among the project staff and participants. The teachers who served as validation team members for the guide are most deserving of recognition for their contribution:

Ronald Ludwick, Lord Fairfax Community College
Earl Reeves, Buffalo Gap High School
Ron Roller, Strasburg High School
Bob Sutphin, James Wood High School
Charles Wade, Dabney Lancaster Community College
(former position)

The members of the Natural Resources Management Committee who provided sound policy guidance, support, and encouragement to project participants are also most deserving of recognition:

Fred Benzinger, Benzinger's Landscaping
William Bratton, Soil Conservation Service
Don Drake, Virginia Division of Forestry
James Hepner, U.S. Forest Service
Harold H. Houle, Village Garden Center
Kelly D. Ramsey, U.S. Forest Service

Appreciation is also expressed to Les Bolt, Project Director, and to Charles Curry and John W. Dickens, Curriculum Specialists, for the project planning, organizing, coordinating, writing, and editing of the guide. Ann B. Parsons, former graduate assistant at James Madison University, is recognized for assisting in the completion of the guide. Glen A. Anderson, Supervisor, Agricultural Education, Virginia Department of Education is recognized for his assistance and guidance in completion of this project.

Dr. Kay B. Brown, Supervisor, Vocational Curriculum Development, Virginia Department of Education, is recognized for coordinating the final publication process. The graphics and organizational and editorial revisions necessary to prepare the manuscript for publication were performed by the Virginia Vocational Curriculum Center, administered by the Henrico County Public Schools, Department of Vocational and Community Education:

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INTRODUCTION

This task analyses guide is designed to be used in combination with the Agricultural Education Service Area Resource in order to implement competency-based education in the course, Natural Resources Management. The service area resource contains information that pertains to all programs within the Agricultural Education area; the sections of that publication are entitled Occupational Information, Student Organization (FFA), Classroom Management Systems, and Recording Systems. This task analyses guide contains the task inventory, suggested task sequence list, and content outline for the specific courses in Natural Resources Management. Detailed instructions for combined use of these two publications are contained within the service area resource.

Using the Task Analyses

Section 1 of the task analyses guide contains a validated task inventory for Natural Resources Management. For each task, applicable information pertaining to performance and enabling objectives, criterion-referenced measures, and suggested instructional activities and aids is provided. In this section, tasks are arranged by worker content/concept areas only, and no attempt has been made to sequence tasks in instructional order.

Section 2 provides a description of the Natural Resources Management programs and courses which incorporate Natural Resources Management. This is followed by a description of the courses, a task sequence list which provides a suggested order of the task inventory for the actual course instruction, and a course content outline. The instructional topics within the course content outline have been cross-referenced with corresponding task/competency codes from the task inventory in Section 1.

It is suggested that the Section 2 task sequence list and course content outline be reviewed initially in order that any desired changes in sequencing of instruction be made. Once the sequencing is confirmed, instructional planning and implementation may proceed through referral to the Section 2 task/competency sheet noted beside each instructional topic within the outline.

SECTION 1.

TASK INVENTORY

One of the major characteristics of competency-based education (CBE) is that the course content is based upon actual jobs or tasks performed by the worker. In Virginia, the Department of Education has established standards for competency-based education. According to these standards, competencies must be role-relevant and based upon appropriate research. This standard states:

> The competencies with standards will be identified through V-TECS, IDECC, and other appropriate research. Advisory committees should be used to review competencies and standards. Competencies in the affective domain will be included. Role-relevant competencies for occupational preparation programs are those that specifically relate to the occupation for which the student is being prepared, as well as to the personal needs of the student. Role-relevant competencies are related also to orientation, exploration, and/or industrial arts experiences which have been identified for students.

Therefore, role-relevant jobs or tasks, called competencies in CBE, must be identified and validated before instructional materials are developed and subsequent instruction takes place. The task list in this guide is based on the following:

1. Job titles and descriptions found in the Occupational Outlook Handbook and Dictionary of Occupational Titles
2. The review and selection of appropriate competency-based materials developed by other states and systems
3. Input from teachers and curriculum specialists
4. Input from project craft advisory committee members.

Based upon the information collected and reviewed from the sources indicated, a task inventory was prepared.

The next major step involved in the development of the task inventory was validation of the listed tasks. Validation is essential if the information collected is to be useful in operating CBE courses and programs. The validation process involved the following:

1. Review by teacher validation team members to determine completeness of the inventory
2. Review and validation by project craft advisory committee to ensure the role-relevance and completeness of the inventory
3. Review by selected teachers to determine the validity of the inventory
4. Final review and editing by validation team members, curriculum specialist, and state staff.

This process was used to determine if the identified tasks were performed by workers presently employed and if each task was critical for entry-level job performance. It was also used to determine the time spent doing the specific task.

The task list included in this guide was based on current available resources and was validated by teachers, advisory committee members, and incumbent workers. It is essential that all instruction be based on the validated task analysis included in the guide or based on a locally prepared, validated task analysis.

The task list has not been arranged in order of difficulty of tasks or instructional sequence. Sequencing has been shown in the sample course outlines contained in Section 2 of this guide.

The task analysis sheets are arranged by content/concept area for the general occupational domain covered by the guide. Information contained on each sheet is as follows:

1. The task/competency for a given content/concept area which provides personal and occupational orientation for workers

2. Program and course application information

3. Performance and enabling objectives for instructional materials development

4. Criterion-referenced measures or test items used to determine successful attainment of the task/competency by the student

5. Instructional activities and steps required for teaching the task/competency

6. Tools, equipment, and supplies required to provide necessary instruction

7. References and audiovisual materials helpful in teaching the task/competency.

TASK INVENTORY FOR

NATURAL RESOURCES MANAGEMENT

CONTENT/CONCEPT AREAS

1. Choosing and Entering a Career in Natural Resources Management
2. Developing Human Relations for a Career in Natural Resources Management
3. Managing a Natural Resources Business or Agency
4. Advertising and Promoting a Natural Resources Enterprise
5. Applying Legal Aspects of Natural Resources Management
6. Protecting the Environment--Air, Soil, and Water
7. Planning and Managing Land Usage
8. Managing Fish and Wildlife
9. Managing the Forest
10. Controlling and Preventing Forest Fires
11. Harvesting Forest Products
12. Sawing Logs into Lumber
13. Managing Recreational Enterprises
14. Surveying Land
15. Constructing and Maintaining Facilities
16. Operating Vehicles and Equipment
17. Maintaining Vehicles and Equipment
18. Groundskeeping
19. Implementing Safety Practices
20. Securing Natural Areas
21. Applying General Knowledge of Natural Resources

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

TASKS/COMPETENCIES

1.1 Identify jobs available in Natural Resources Management

1.2 Describe the main occupations in Natural Resources Management

1.3 Select a tentative occupation

1.4 Write a letter of application

1.5 Complete a job application

1.6 Construct a personal data sheet or resume

1.7 Demonstrate personal interviewing skills

1.8 Write a follow-up letter of appreciation

1.9 Complete a placement agreement

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

1.1 Identify jobs available in Natural Resources Management

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

1.1

PERFORMANCE OBJECTIVE

P1.1 Given a list of job titles, identify the jobs available in Natural Resources Management by completing the Identifying Job Titles Checklist with 100 percent accuracy. Jobs identified must be listed in the Dictionary of Occupational Titles with descriptions relative to natural resources.

SELECTED ENABLING OBJECTIVES

E1.1.1 Define job title or occupational title.

E1.1.2 Describe the field of Natural Resources Management.

E1.1.3 Locate natural resources management occupational titles in the Dictionary of Occupational Titles.

E1.1.4 Write job descriptions for natural resources management occupations.

E1.1.5 Identify natural resources businesses or agencies in the community.

E1.1.6 List occupational titles for natural resources management occupations in the community.

E1.1.7 Classify job titles in each natural resources business or agency into the following categories: unskilled, skilled/technical, and managerial/supervisory.

E1.1.8 Identify educational and experiential requirements for natural resources management occupations.

CRITERION-REFERENCED MEASURE

C1.1 Identify the jobs available in Natural Resources Management by completing the Identifying Job Titles Checklist with 100 percent accuracy (Test #1). Jobs identified must be listed in the Dictionary of Occupational Titles with descriptions relative to natural resources.

STUDENT'S NAME:______________________ TEST # 1

COURSE:______________________ P.O.# 1.1

DATE:______________________ STANDARD: 100%

TEACHER'S NAME:______________________ PERFORMANCE LEVEL:_____

IDENTIFYING JOB TITLES CHECKLIST

Place a check in the blank before each job title that is found within Natural Resources Management.

_____1. broadcast technician

_____2. survey helper

_____3. drafter

_____4. meteorologist

_____5. groundskeeper, parks and grounds

_____6. motorcycle mechanic

_____7. all-round logger

_____8. emergency medical technician

_____9. soil conservationist

_____10. photographer

_____11. forest worker

_____12. oil pumper

_____13. tree planter

_____14. sales route driver

_____15. fish hatchery worker

_____16. range manager

_____17. furnace operator

_____18. forester aide

_____19. radiation monitors

_____20. Christmas tree farm worker

(2,5,7,9,11,13,15,16,18,20)

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare a directory of natural resources management occupations (E1.1.1, E1.1.2, E1.1.3, E1.1.8).
2. Have students write descriptions for specific natural resources management job titles, using the Dictionary of Occupational Titles (E1.1.4, E1.1.7).
3. Have students use yellow pages in the telephone book to identify natural resources management businesses or agencies in the community (E1.1.5).
4. Have students contact personnel directors in local natural resources businesses or agencies by telephone and list occupational titles (E1.1.6).
5. Prepare a bulletin board, using classified ads for employment from newspapers (E1.1.5-E1.1.6).

SELECTED TOOLS AND MATERIALS

Bulletin Board
Newspapers
Telephone
Telephone book
Identifying Job Titles Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Agricultural Career Opportunities, Virginia Department of Agriculture and Consumer Services.
Filmstrips: (1) Agricultural Production (2) Agricultural Products (3) Agriculture Resources (4) Environmental Protection (5) Equipment and Mechanics (6) Forestry (7) Ornamental Horticulture (8) Supplies and Services. Careers in Agriculture, Vocational Education Productions.
Filmstrip: Resource Law Enforcement, Vocational Education Productions.
Filmstrip: Virginia's Forests-Careers in Forestry, Virginia Department of Education.

SELECTED REFERENCES

Books:
Dictionary of Occupational Titles, U.S. Department of Labor, Employment and Training Administration.
Occupational Outlook Handbook, U.S. Department of Labor, Bureau of Labor Statistics.
Working in Agricultural Industry, Jasper S. Lee.

Teaching Materials:
Opportunities in Agricultural Occupations, Ohio Agricultural Education Curriculum Materials Service.
Telephone Directories
The Job Hunting Game: An Educational Role Playing Game, Douglas Eidsmore.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

1.2 Describe the main occupations in Natural Resources Management

COURSE

Natural Resources Management IV (8042)

1.2

PERFORMANCE OBJECTIVE

P1.2 Given access to library reference materials or an incumbent worker, describe all of the main occupations in natural resources management on instructor-prepared worksheet. Acceptable performance must include the following factors in the descriptions: the nature of work; education required; jobs available; advancement opportunities; working conditions; average salary; and, fringe benefits.

SELECTED ENABLING OBJECTIVES

E1.2.1 Find reference materials in the school or classroom library or discuss the topic with an incumbent worker.

E1.2.2 Locate or determine relevant information.

E1.2.3 Organize information into written form.

E1.2.4 Use proper grammar, spelling, and vocabulary.

E1.2.5 Write legibly.

CRITERION-REFERENCED MEASURE

C1.2 Describe all of the main occupations in natural resources management on instructor-prepared worksheet by including the following factors: the nature of work, education required, jobs available, advancement opportunities, working conditions, average salary, and fringe benefits for each occupation. Information should be collected from library reference materials or an incumbent worker and written to include all the factors mentioned.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the purpose of preparing a written description of each main occupation in natural resources management (E1.2.1-E1.2.5).
2. Have school librarian provide training on the use of library facilities (E1.2.1, E1.2.2).
3. Have students present an oral report to the class on the occupation which most interests them (E1.2.1-E1.2.3).
4. Evaluate papers for spelling, grammar, vocabulary, and handwriting (E1.2.4, E1.2.5).
5. Post acceptable reports on the classroom bulletin board to show the diversity of natural resources management occupations (E1.2.1-E1.2.5).

SELECTED TOOLS AND MATERIALS

Bulletin board
Instructor-prepared worksheet on describing occupations

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Agriculture Resources (2) Environmental Protection (3) Equipment and Mechanics (4) Forestry. Careers in Agriculture, Vocational Education Productions.

Filmstrip: Resource Law Enforcement, Vocational Education Productions.

SELECTED REFERENCES

Books:
Dictionary of Occupatioal Titles, U.S. Department of Labor, Employment Training Administration.
Occupational Outlook Handbook, U.S. Department of Labor, Bureau of Labor Statistics.

Teaching Materials:
Challenging Careers in Soil Conservation, USDA, Soil Conservation Service.
Guide to Conservation Careers, National Association of Conservation Districts.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

1.3 Select a tentative occupation

COURSE

Natural Resources Management V
(8044)

1.3

PERFORMANCE OBJECTIVE

P1.3 Given instruction on the decision-making process, report specifications, information on several natural resources management occupations, and the opportunity to investigate others, select a tentative occupation in natural resources management and write a two-page report, which must include the following information on selected occupation: description of duties; personal education/training requirements; benefits and working conditions; and, projected employment outlook. Report must be rated acceptable according to instructor-prepared report specifications.

SELECTED ENABLING OBJECTIVES

E1.3.1 Evaluate personal career goals, interests, abilities, and motivation

E1.3.2 Describe the decision-making process (see Task 2.9).

E1.3.3 Select a tentative occupation in natural resources management using the decision-making process.

CRITERION-REFERENCED MEASURE

C1.3 Select a tentative occupation in natural resources management and write a two-page report, which must include the following information on selected occupation: description of duties; personal education/training requirements; benefits and working conditions; and, projected employment outlook. Report must be rated acceptable according to instructor-prepared report specifications.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students review their scores on standardized aptitude and interest tests (E1.3.1).
2. Using the list of jobs identified in P1.1, have students rank them in order of personal interest, ability, and initiative (E1.3.1).
3. Discuss with students the steps in the decision-making process (E1.3.2).
4. Have guidance counselor review career decision-making with students (E1.3.2).
5. Have students practice making decisions, using the decision-making process (E1.3.3).
6. Have students apply decision-making process, using information about themselves and job requirements by making a decision on a tentative natural resources management occupational goal (E1.3.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared report specifications

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Group Instruction Handbook-Cooperative Part-time Training, pp. 17-23, 33-35, College Station, Texas: Vocational Instructional Services.
Human Relations in Agribusiness, pp. 46-59, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.
You're Hired-Getting the Right Job for You, The University of Texas at Austin: Instructional Materials Services.

Teaching Materials:
Choosing Your Work, Ohio Agricultural Education Curriculum Materials Service.
Locating Your Job, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

1.4 Write a letter of application

COURSE

Natural Resources Management IV
(8042)

1.4

PERFORMANCE OBJECTIVE

P1.4 Given guidelines on how to prepare and write a letter for employment, write a letter of application. Successful performance will be an acceptable rating by the instructor on 100 percent of all items on the Letter of Application Checklist.

SELECTED ENABLING OBJECTIVES

E1.4.1 List information to be included in a letter of application.

E1.4.2 Write a formal letter of application.

E1.4.3 Demonstrate knowledge of grammar, spelling, and vocabulary skills.

E1.4.4 Demonstrate legible handwriting or typing skills.

CRITERION-REFERENCED MEASURE

C1.4 Write a letter of application and score an acceptable rating by the instructor on 100 percent of all items on the Letter of Application Checklist (Test #2).

STUDENT'S NAME: ____________________ TEST # 2

COURSE: ____________________ P.O. # 1.4

DATE: ____________________ STANDARD: 100%

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: ______

LETTER OF APPLICATION CHECKLIST

ITEM	INSTRUCTOR'S RATING	
The letter:	Acceptable	Unacceptable
1. tells how you learned about the job.	____	____
2. states desire to be considered an applicant.	____	____
3. states specific qualifications or experiences.	____	____
4. includes appropriate references.	____	____
5. requests an interview.	____	____
6. is neatly written.	____	____
7. uses correct business letter form.	____	____
8. is free from errors.	____	____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a sample letter of application and provide students with a copy (E1.4.1, E1.4.2).
2. Have students write letters of application (E1.4.2).
3. Post acceptable letters on bulletin board; use peer evaluation and discussion of each letter (E1.4.1-E1.4.4).
4. Conduct a contest and recognize all letters achieving an acceptable standard (E1.4.1-E1.4.4).

SELECTED TOOLS AND MATERIALS

Bulletin board
Letter of Application Checklist (see attached)
Instructor-prepared guidelines on letters of application
Instructor-prepared sample letter of application

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
An Introduction to Agricultural Business and Industry, pp. 57-64, J. Thomas Weyant, et.al.
Human Relations in Agribusiness, pp. 66-68, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.
Working in Agricultural Industry, pp. 35-37, Jasper S. Lee.
You're Hired--Getting the Right Job for You, pp. 77, 78, The University of Texas at Austin: Instructional Materials Services.

Teaching Matherials:
Getting Hired for Your First Job, Ohio Agricultural Education Curriculum Materials Service.
Opportunities in Agricultural Occupations, Ohio Agricultural Education Cirriculum Materials Service.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

1.5 Complete a job application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

1.5

PERFORMANCE OBJECTIVE

P1.5 Given guidelines on completing a job application from a natural resources management business or agency, complete the Job Application Form, providing all appropriate information. The completed application must be neat, accurate, and grammatically correct according to instructor-prepared guidelines.

SELECTED ENABLING OBJECTIVES

E1.5.1 List the information required on most job applications.

E1.5.2 Secure and record personal information necessary to complete a job application.

E1.5.3 Demonstrate knowledge of grammar, spelling, and vocabulary skills.

E1.5.4 Demonstrate legible handwriting or typing skills.

CRITERION-REFERENCED MEASURE

C1.5 Complete the Job Application Form (Test #3) providing all appropriate information. Completed application must be neat, accurate, and grammatically correct according to instructor-prepared guidelines.

STUDENT'S NAME: ____________________ TEST # 3

COURSE: ____________________ P. O. # 1.5

DATE: ____________________ STANDARD: ____________

TEACHER'S NAME ____________________ PERFORMANCE LEVEL: ____________

Job Application Form

CRM: Complete the job application, providing all appropriate information. Completed application must be neat, accurate, and grammatically correct.

1. Kind of position (job) for which you are applying

2. Home Phone
Area Code/ Number

3. Work Phone
Area Code/ Number

4. Preferred Title (mark one)
Mr. Mrs. Miss Ms.

5. Other last names ever used (e.g. maiden)

6. Name (Last, First, Middle)

Street Address or RFD No. (include apt. no., if any)

City

State

Zip Code

7. Birth Date (month, day, year)

8. Social Security Number

9. Are you available for temporary employment lasting:

	Yes	No
A. Less than 1 month?	☐	☐
B. 1 to 4 months?	☐	☐
C. 5 to 12 months?	☐	☐

10. Are you available for part-time positions offering:

	Yes	No
A. 20 or fewer hours per week	☐	☐
B. 20 to 31 hours per week	☐	☐
C. 32 to 39 hours per week	☐	☐

11. List dates, branch, and serial number of all active U.S. military service (enter N/A if not applicable)

From	To	Branch of Service	Service or Serial No.

12. Experience: Begin with current or most recent work or volunteer experience and work back.

13. May inquiry be made of your present employer regarding your character, qualifications, and record of employment? (circle one)

Yes No

A. Name and address of employer's organization	Dates employed From To	Average no. of hours per week
	Salary Beginning $ per Ending $ per	Place of employment City State

Exact title of your position	Name of immediate supervisor	Area Code	Phone No.

Kind of business or organization	Reason for leaving

Description of work:

B. Name and address of employer's organization	Dates employed From To	Average no. of hours per week
	Salary Beginning $ per Ending $ per	Place of employment City State

Exact title of your position	Name of immediate supervisor	Area Code	Phone No.

Kind of business or organization	Reason for leaving

Description of work:

use additional sheet, if needed

14. Education: Give date and degree earned or date expected to graduate.

Name and location	Dates Attended From To	Yrs. Completed Day Night	Credits Completed Semester or Quarter Hrs	Type of Degree	Yr. of Degree

15. Describe other experiences related to your background or experiences that qualify you for the job applied for: ________________________

References: List three persons NOT related to you and who have definite knowledge of you.

Full Name	Present Address	Business Occupation

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have a personnel director from a natural resources business or agency discuss job applications with students (E1.5.1).

2. Have students record information necessary to complete a job application (E1.5.2).

3. Using an overhead projector, demonstrate how to complete a job application properly (E1.5.1-E1.5.2).

4. Have students role play employers and evaluate peer applications (E1.5.1-E1.5.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared guidelines on job application
Job Application Form (see attached)
Overhead projector

SELECTED AUDIOVISUAL MATERIALS

Slidefilm: Applying for a Job, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
An Introduction to Agricultural Business and Industry, pp. 57-63, J. Thomas Weyant, et. al.
Group Instruction Handbook--Cooperative Part-Time Training, pp. 51-60, College Station, Texas: Vocational Instructional Services.
Human Relations in Agribusiness, pp. 64-66, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.
You're Hired--Getting the Right Job for You, pp. 85-112, The University of Texas at Austin: Instructional Materials Services.

Teaching Materials:
Applying for a Job, Urbana, Illinois: Vocational Agriculture Service.
Getting Hired for Your First Job, Ohio Agricultural Education Curriculum Materials Service.
Opportunities in Agricultural Occupations, pp. 30-25, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

1.6 Construct a personal data sheet or resume

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management IV (8042)

1.6

PERFORMANCE OBJECTIVE

P1.6 Given samples for reference on preparation of personal information, construct a personal data sheet or resume. Successful performance will be an acceptable rating by the instructor on 100 percent of all items on the Personal Data Sheet Checklist.

SELECTED ENABLING OBJECTIVES

E1.6.1 List categories of information to be included in a personal data sheet or resume.

E1.6.2 Record work experience and educational experience.

E1.6.3 Identify jobs which coincide with competencies mastered.

E1.6.4 Demonstrate knowledge of grammar, spelling, and vocabulary skills.

E1.6.5 Demonstrate handwriting or typing skills.

CRITERION-REFERENCED MEASURE

C1.6 Construct a personal data sheet or resume that receives an acceptable rating by the instructor on 100 percent of all itmes on the Personal Data Sheet Checklist (Test #4), according to instructor-prepared guidelines.

STUDENT'S NAME: ______________________ TEST # 4

COURSE: ______________________ P. O. # 1.6

DATE: ______________________ STANDARD: 100%

TEACHER'S NAME: ______________________ PERFORMANCE LEVEL: ____________

PERSONAL DATA SHEET CHECKLIST

ITEM	INSTRUCTOR'S RATING	
The personal data sheet (if applicable):	Acceptable	Unacceptable
1. contains pertinent personal data.	____	____
2. contains educational preparation.	____	____
3. contains employment or volunteer experience.	____	____
4. contains vocational skills.	____	____
5. contains major honors/awards.	____	____
6. contains organizations/hobbies.	____	____
7. contains references.	____	____
8. is neatly written or typed.	____	____
9. uses acceptable form.	____	____
10. is free from errors.	____	____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss with students the types of information included in a personal data sheet or resume (E1.6.1).
2. Have students record work and educational experiences (E1.6.2).
3. Have students review competencies mastered and identify their marketable skills (E1.6.3).
4. Have students construct personal data sheet or resume (E1.6.1-E1.6.5).
5. Have personal data sheet or resume typed and copied for students to use (E1.6.1-E1.6.5).

SELECTED TOOLS AND MATERIALS

Personal Data Sheet Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

An Introduction to Agricultural Business and Industry, pp. 51-56, J. Thomas Weyant, et.al.

Group Instruction Handbook--Cooperative Part-time Training, pp.24-32, College Station, Texas: Vocational Instructional Services.

Human Relations in Agribusiness, pp. 66-68, John Hillison and John R. Crunkilton.

Working, Virginia Department of Education, Division of Vocational Education.

Working in Agricultural Industry, p. 37, Jasper S. Lee.

Teaching Materials:

Getting Hired for Your First Job, Ohio Agricultural Education Curriculum Materials Service.

Job Application and Job Interviews, Virginia Department of Education, Public Information and Publications Office.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

1.7 Demonstrate personal interviewing skills

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

1.7

PERFORMANCE OBJECTIVE

P1.7 Given a role play involving a job interview, demonstrate personal interviewing skills. Acceptable performance must be a minimum score of three points for each factor on the Job Interview Checklist as evaluated by instructor's observation of role play.

SELECTED ENABLING OBJECTIVES

E1.7.1 Explain the purpose and importance of a job interview.

E1.7.2 Describe appropriate dress for a job interview.

E1.7.3 List materials to take to an interview.

E1.7.4 List questions frequently asked during an interview.

E1.7.5 Explain courtesies to exhibit during an interview.

E1.7.6 List behaviors that may prevent a job from being offered.

E1.7.7 Describe various interview techniques and procedures.

CRITERION-REFERENCED MEASURE

C1.7 Demonstrate personal interviewing skills by scoring a minimum of three points for each factor on the Job Interview Checklist (Test #5), as rated by instructor's evaluation of role play.

STUDENT'S NAME: ____________________ TEST # 5

COURSE: ____________________ P.O. # 1.7

DATE: ____________________ STANDARD: Score of 3 on each item

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: ________

4--Outstanding
3--Very Good
2--Satisfactory
1--Unsatisfactory

JOB INTERVIEW CHECKLIST

Factor	4	3	2	1
The interviewee: 1. dressed appropriately for the occasion.				
2. was punctual.				
3. did not exhibit unpleasant mannerisms.				
4. answered questions in a confident manner.				
5. used correct grammar				
6. exhibited good listening skills.				
7. asked questions relevant to the position sought.				
8. presented his or her strengths or weaknesses in relation to the position sought.				
9. displayed sincerity during the interview.				
10. made a graceful exit upon completion of the interview.				
TOTAL				

(continued)

Comments: ____

____

____

____

____

____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students role play personal interviews and have peers complete a Job Interview Checklist (E1.7.1-E1.7.7).
2. Video-tape role played interviews and discuss tapes (E1.7.1-E1.7.7).
3. Have a personnel director from a natural resources management business or agency come to class and interview students (E1.7.1-E1.7.7).
4. Conduct a job interview contest (E1.7.1-E1.7.7).
5. Have all students who are placed for cooperative work experience interview with the training station employer before placement (E1.7.1-E1.7.7).

SELECTED TOOLS AND MATERIALS

Video-tape player/recorder
Job Interview Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Preparing for a Job (2) The Help-Wanted Ads (3) Applying for a Job (4) The Job Application Form (5) The Job Interview. Getting a Job Series, Career Aids, Inc.

Filmstrips: (1) What Do I Have That a Job Needs? (2) The Job Environment and Me (3) Want Ads (4) Application Forms (5) Job Interview Skills. Me and Jobs Series, Career Aids, Inc.

SELECTED REFERENCES

Books:
An Introduction to Agricultural Business and Industry, pp. 59-70, J. Thomas Weyant, et.al.
Group Instruction Handbook--Cooperative Part-Time Training, pp. 70-74, College Station, Texas: Vocational Instructional Services.
Human Relations in Agribusiness, pp. 68-70, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.
Working in Agricultural Industry, pp. 37-39, Jasper S. Lee.
You're Hired--Getting the Right Job for You, pp. 119-164, The University of Texas at Austin: Instructional Materials Services.

Teaching Materials:
Getting Hired for Your First Job, Ohio Agricultural Education Curriculum Materials Service.
Job Application and Job Interviews, Virginia Department of Education, Public Information and Publications Office.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

1.8 Write a follow-up letter of appreciation

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

1.8

PERFORMANCE OBJECTIVE

P1.8 Given examples of follow-up letters, write a follow-up letter of appreciation for a personal interview. Successful performance will be an acceptable rating by the instructor on 100 percent of the items on the Follow-Up Letter Checklist.

SELECTED ENABLING OBJECTIVES

E1.8.1 List information to be included in a follow-up letter.

E1.8.2 Explain the purpose of a formal follow-up letter of apreciation.

E1.8.3 Demonstrate knowledge of grammar, spelling, and vocabulary skills.

E1.8.4 Demonstrate legible handwriting or typing skills.

CRITERION-REFERENCED MEASURE

C1.8 Write a follow-up letter of appreciation for a personal interview. An acceptable rating by the instructor on 100 percent of the items on the Follow-Up Letter Checklist must be achieved (Test #6).

STUDENT'S NAME: ____________________ TEST # 6

COURSE: ____________________ P. O. # 1.8

DATE: ____________________ STANDARD: 100%

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: __________

FOLLOW-UP LETTER CHECKLIST

ITEM	INSTRUCTOR'S RATING	
The follow-up letter:	Acceptable	Unacceptable
1. expresses appreciation for the interview.	____	____
2. states desire to be considered an applicant.	____	____
3. relates positive information learned during interview.	____	____
4. compliments prospective employer.	____	____
5. is neatly written or typed.	____	____
6. uses acceptable form.	____	____
7. is free from errors.	____	____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a sample follow-up letter and provide students with a copy (E1.8.1).
2. Have students write follow-up letters (E1.8.2).
3. Post acceptable letters on bulletin board; use peer evaluation and discussion of each letter (E1.8.1-E1.8.4).
4. Conduct a contest and recognize all letters achieving an acceptable standard (E1.8.1-E1.8.4).

SELECTED TOOLS AND MATERIALS

Bulletin board
Instructor-prepared guidelines on follow-up letters
Instructor-prepared sample follow-up letter
Follow-Up Letter Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Human Relations in Agribusiness, p. 70, John Hillison and John R. Crunkilton.
Secondary grammar textbooks:
Working, Virginia Department of Education, Division of Vocational Education.
You're Hired--Getting the Right Job for You, pp. 170, 171, The University of Texas at Austin: Instructional Materials Services.

CONTENT/CONCEPT

1. CHOOSING AND ENTERING A CAREER IN NATURAL RESOURCES MANAGEMENT

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

1.9 Complete a placement agreement

COURSE

Natural Resources Management V
(8044)

1.9

PERFORMANCE OBJECTIVE

P1.9 Given a list of competencies to be completed, a placement agreement form, and a cooperative work station, complete a placement agreement between the school, the employer, and the student. Acceptable performance will be achieved when all parties have accepted and signed the agreement.

SELECTED ENABLING OBJECTIVES

E1.9.1 Review the placement agreement form and obtain all necessary information.

E1.9.2 Determine whether employer will provide the experiences necessary to complete the required competencies.

E1.9.3 Visit the work station and prospective employer.

E1.9.4 Determine the expectations of the employer and coordinating teacher.

CRITERION-REFERENCED MEASURE

C1.9 Complete a placement agreement between the school, the employer, and the student. Acceptable performance will be achieved when all parties have accepted and signed the agreement.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide students with a placement agreement form (E1.9.1).
2. Review the purposes for a cooperative work experience placement agreement (E1.9.1).
3. Provide students with a list of competencies necessary to complete the natural resources management program and discuss the opportunity to complete certain competencies during the cooperative work experience placement (E1.9.2).
4. Hold an individual conference with the students and the prospective employer (E1.9.3, E1.9.4).

SELECTED TOOLS AND MATERIALS

Placement Agreement Form
Instructor-prepared competency list

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

Learning Through Experience in Agricultural Industry, Max L. Amberson and B. Harold Anderson.

Teaching Materials:

National Ag Occupations Competency Study: National Study for Identifying and Validating Essential Agricultural Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations, Washington, D.C.: Government Printing Office.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASKS/COMPETENCIES

2.1 Demonstrate skills in communicating with others

2.2 Evaluate aspects of personal appearance or physical traits which may hinder an individual's employability

2.3 Define and recognize the importance of etiquette

2.4 Exhibit positive human relations traits

2.5 Identify the basic human needs which play a part in worker motivation

2.6 Maintain effective relations between and/or among fellow employees

2.7 Maintain effective supervisory relations with employee

2.8 Maintain effective relations with employer/firm

2.9 Make a decision, using the decision-making process

Application

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.1 Demonstrate skills in communicating with others

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

2.1

PERFORMANCE OBJECTIVE

P2.1 Given a role play involving a natural resources management training station, demonstrate skills in communicating with others. Acceptable performance will be an acceptable rating on 80 percent of the items on the Communication Rating Checklist, as evaluated by instructor during the role play.

SELECTED ENABLING OBJECTIVES

E2.1.1 List the ways humans communicate (speaking, writing, listening, gestures, facial expressions, personal actions, posture, symbols, seeing, observing).

E2.1.2 Define communication.

E2.1.3 Describe the communication model.

E2.1.4 List the causes for breakdowns in communication.

E2.1.5 Demonstrate ability to follow oral and written instructions.

CRITERION-REFERENCED MEASURE

C2.1 Demonstrate skills in communicating with others in role play by scoring an acceptable rating on 80 percent of the items on the Communication Rating Checklist (Test #7), as evaluated by instructor during the role play.

STUDENT'S NAME: ____________________ TEST #: 7

COURSE: ____________________ P.O. #: 2.1

DATE: ____________________ STANDARD: 80%

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: __________

COMMUNICATION RATING CHECKLIST

The student:	Acceptable	Acceptable but Needs this Improvement	Unsatisfactory
1. spoke in a clean, distinct voice.			
2. enuniciated words correctly.			
3. listened attentively when spoken to.			
4. carried out oral or written instructions.			
5. avoided slang or curse words when speaking.			
6. exhibited non-verbal behavior(s) that agreed with the verbal message(s) sent.			
7. accurately relayed an oral message given to him or her by one person for another person.			
8. wrote an accurate message for another person, based upon oral instructions.			
9. recognized and obeyed safety and health signs posted on the job and in the school laboratory.			
10. regulated voice volume to account for room size, noise level, and purpose for speaking.			

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare and present a formal speech (E2.1.1).
2. Have students participate in impromptu speaking to the class (E2.1.1).
3. Have students debate current issues in agricultural business (E2.1.1).
4. Have students role play situations involving nonverbal communication and discuss results (E2.1.1-E2.1.5).
5. Use a Communication Rating Checklist during other school activities to call attention to the importance of communication (E2.1.1-E2.1.4).
6. Evaluate students on listening and following instructions (E2.1.5).

SELECTED TOOLS AND MATERIALS

Communication Rating Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Talking and Listening (2) Listen and Learn (3) Talk Better and Get Ahead. Oral Communication Series, Career Aids, Inc.

SELECTED REFERENCES

Books:

An Introduction to Agricultural Business and Industry, J. Thomas Weyant, et.al.
Group Instruction Handbook--Cooperative Part-time Training, pp. 140-143, College Station, Texas: Vocational Instructional Services.
Human Relations in Agribusiness, pp. 93-101, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.
Working in Agricultural Industry, pp. 62-74, Jasper S. Lee.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.2 Evaluate aspects of personal appearance or physical traits which may hinder an individual's employability

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

2.2

PERFORMANCE OBJECTIVE

P2.2 Given a discussion regarding adverse aspects of personal appearance or physical traits and a list of natural resources management occupations, evaluate the effects of these aspects on an individual's employability in each occupation. Acceptable performance will be achieved by completing all items on the Personal Appearance/Physical Traits Checklist.

SELECTED ENABLING OBJECTIVES

E2.2.1 Compare the nature of work with human physical traits.

E2.2.2 Analyze personal physical traits.

E2.2.3 List the physical requirements of natural resources management occupations.

E2.2.4 Explain the importance of maintaining good physical condition.

CRITERION-REFERENCED MEASURE

C2.2 Evaluate the effects of adverse aspects of personal appearance or physical traits on an individual's employability in a particular occupation by completing all items on the Personal Appearance/Physical Traits Checklist (Test #8).

STUDENT'S NAME: ______________________ TEST #: 8

COURSE: ______________________ P.O. #: 2.2

DATE: ______________________ STANDARD: Completion only

TEACHER'S NAME: ______________________ PERFORMANCE LEVEL: ____________

PERSONAL APPEARANCE/PHYSICAL TRAITS CHECKLIST

Occupations

	Fish Hatchery Worker		Forester Aide		Soil Conservationist	
Adverse aspects	Employable	Not Employable	Employable	Not Employable	Employable	Not Employabl
Soiled, torn clothing	-		-		-	
Baggy, outdated clothing	-		-		-	
Stylish, "faddish" clothing	-		-		-	
Over or underweight	-		-		-	
Poor physical condition	-		-		-	
Unkempt appearance (hair, skin, nails)	-		-		-	
Poor posture (standing)	-		-		-	
Lack of personal grooming	-		-		-	
Drug or alchol use		+		+		+

+ = definitely employable or not employable
- = questionable as to employability

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss with students the importance of personal appearance in certain jobs (E2.2.1).

2. Discuss the effects of personal appearance on personality development (E2.2.2).

3. Take students to visit several different natural resources management businessess or agencies to observe physical requirements of jobs (E2.2.3).

4. Have students rate themselves in relation to physical requirements of natural resources management jobs (E2.2.3).

5. Have students develop a fitness plan for physical self-improvement (E2.2.4).

SELECTED TOOLS AND MATERIALS

Personal Appearance/Physical Traits Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Note: Any filmstrips or movies showing persons in appropriate attire for work setting could be used to illustrate this point.

SELECTED REFERENCES

Books:
An Introduction to Agricultural Business and Industry, J. Thomas Weyant, et.al.
Human Relations in Agribusiness, pp. 37-45, John Hillison and John R. Crunkilton.

Teaching Materials:
Fitness and Work Capacity, USDA, Forest Service.
Opportunities in Agricultural Occupations, Ohio Agricultural Education Curriculum Materials Service.
Taking Care of Yourself, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.3 Define and identify the importance of etiquette

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

2.3

PERFORMANCE OBJECTIVE

P2.3 Given resources on etiquette, define etiquette and identify the importance of practicing proper etiquette by scoring 80 percent correct answers on the etiquette test.

SELECTED ENABLING OBJECTIVES

E2.3.1 Define etiquette.

E2.3.2 Describe the importance of practicing proper etiquette.

E2.3.3 Relate the importance of practicing proper etiquette to job security and advancement.

E2.3.4 List and describe social forms acceptable by society.

CRITERION-REFERENCED MEASURE

C2.3 Define etiquette and identify the importance of practicing proper etiquette. A score of 80 percent correct answers must be achieved on Test Your Etiquette (Test #9).

STUDENT'S NAME:____________________ TEST #: 9

COURSE:____________________ P.O. #: 2.3

DATE:____________________ STANDARD: 80%

TEACHER'S NAME:____________________ PERFORMANCE LEVEL:________

TEST YOUR ETIQUETTE

Circle the letter T if the statement is true or the letter F if the statement is false.

T F 1. Etiquette means the proper way to conduct a meeting.

T F 2. There are suggested rules to follow in making introduction of one person to another.

T F 3. Writing thank-you letters is no longer considered necessary when you have thanked an individual in person.

T F 4. Rules of etiquette are best practiced at home and not on the job.

T F 5. "Sir" and "Ma'am" should be reserved titles for older persons.

T F 6. Dinner manners should be used at all meals.

T F 7. Telephone etiquette would include identifying yourself at the beginning of a phone call to a stranger.

T F 8. Handkerchiefs should be used when sneezing or coughing.

T F 9. Very few jobs are lost because of a lack of manners.

T F 10. The higher up the job ladder--the more important practicing of good etiquette becomes.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare and discuss a list of manners important to success in a natural resources management occupation (E2.3.2, E2.3.3).

2. Demonstrate proper table etiquette (E2.3.4).

3. Role play the proper way to make introductions (E2.3.4).

4. Simulate a telephone conversation for students to use proper telephone etiquette (E2.3.4).

5. Invite the home economics teacher to discuss the topic with the class (E2.3.1-E2.3.4).

SELECTED TOOLS AND MATERIALS

Telephone
Instructor-prepared list of manners
Test Your Etiquette (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

Group Instruction Handbook--Cooperative Part-time Training, pp. 108-148, College Station, Texas: Vocational Instructional Services.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.4 Exhibit positive human relations traits

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

2.4

PERFORMANCE OBJECTIVE

P2.4 Given a situation involving a natural resources business or agency, and a list of traits associated with positive human relations that are evidenced both on the job and in the classroom, exhibit these traits throughout the course. Performance must be rated acceptable on 80 percent of the items according to the instructor on the Human Relations Checklist and will be evaluated on an ongoing basis.

SELECTED ENABLING OBJECTIVES

E2.4.1 Define human relations.

E2.4.2 List acceptable human relations techniques.

E2.4.3 Identify the relationship between positive human relations skills and employability.

E2.4.4 Explain importance of positive human relations (e.g., accept criticism in a constructive manner).

CRITERION-REFERENCED MEASURE

C2.4 Exhibit positive human relations traits throughout the course. Performance must be rated acceptable on 80 percent of the items according to the instructor on the Human Relations Checklist (Test #10) and will be evaluated on an ongoing basis.

STUDENT'S NAME:______________________ TEST #: 10

COURSE:______________________ O.P. #: 2.4

DATE:______________________ STANDARD: 80%

TEACHER'S NAME:______________________ PERFORMANCE LEVEL:________

HUMAN RELATIONS CHECKLIST

The worker is able to:	Acceptable	Not Acceptable
1. meet and greet others in an acceptable manner.	______	______
2. avoid deliberate "put-downs" of others.	______	______
3. avoid distracting or unsightly mannerisms.	______	______
4. compliment others in a sincere fashion.	______	______
5. accept praise from others in a humble manner.	______	______
6. acknowledge the contributions made by others during completion of a task.	______	______
7. present a positive, healthy approach to living and to problem situations.	______	______
8. communicate effectively with others through written and oral means.	______	______
9. express sympathy, congratulations, and other emotions appropriate to the situation.	______ ______	______ ______
10. avoid racial, social, cultural, or other biases.	______	______

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students write case studies of persons exhibiting negative and positive human relations skills (E2.4.2).
2. Obtain transparencies indicating positive and negative human relations techniques and discuss with students (E2.4.1-E2.4.4).
3. Obtain audio or video-tapes of students speaking with enthusiasm and present to students for discussion (E2.4.4).
4. Have students evaluate their own human relations skills (E2.4.4).

SELECTED TOOLS AND MATERIALS

Tape recorder
Transparencies on human relations
Video-tape player/recorder
Instructor-prepared list of human relations traits
Human Relations Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

An Introduction to Agricultural Business and Industry, J. Thomas Weyant, et.al.

Group Instruction Handbook--Cooperative Part-Time Training, pp. 108-148, College Station, Texas: Vocational Instructional Services.

Human Relations in Agribusiness, pp. 1-22, John Hillison and John R. Crunkilton.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.5 Identify the basic human needs which play a part in worker motivation

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

2.5

PERFORMANCE OBJECTIVE

P2.5 Given resources on basic human needs, identify those needs which play a part in worker motivation on instructor-prepared worksheet. Acceptable performance will be attained when five of the following basic human needs are identified correctly: life sustenance, physical safety, respect, self-esteem, self-realization, and self-actualization.

SELECTED ENABLING OBJECTIVES

E2.5.1 List the basic human needs in order of attainment.

E2.5.2 Define and describe each of the categories of basic human need.

E2.5.3 Explain the relationship of the attainment of the basic human needs to worker motivation.

CRITERION-REFERENCED MEASURE

C2.5 Identify the basic human needs which play a part in worker motivation on instructor-prepared worksheet. At least five of the following basic human needs must be correctly identified: life sustenance, physical safety, respect, self-esteem, self-realization, and self-actualization.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a discussion with students to identify basic human needs. As a summary, write titles of the basic human needs on the chalkboard in order of attainment (E2.5.1).

2. Discuss and define each category of basic human need (E2.5.2).

3. Ask students to describe situations where humans are functioning at each level (E2.5.1, E2.5.2).

4. Have students relate the attainment of basic human needs to worker motivation (E2.5.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared worksheet on human needs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Human Relations in Agribusiness, pp. 14-19, John Hillison and John R. Crunkilton.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

2.6 Maintain effective relations between and/or among fellow employees

COURSE

Natural Resources Management V
(8044)

2.6

PERFORMANCE OBJECTIVE

P2.6 Given a situation of being placed in a natural resources management training station and guidelines on employee relations, maintain effective relations between and/or among fellow employees. Acceptable performance will be an acceptable rating on 80 percent of the items on the Effective Relationships Checklist, as evaluated by instructor.

SELECTED ENABLING OBJECTIVES

E2.6.1 Explain importance of developing a positive attitude.

E2.6.2 Define marketable personality.

E2.6.3 Explain the importance of having tolerance for others.

E2.6.4 List methods of getting along with others.

CRITERION-REFERENCED MEASURE

C2.6 Maintain effective relations between and/or among fellow employees by scoring an acceptable rating on 80 percent of the items on the Effective Relationships Checklist (Test #11), as evaluated by the instructor.

STUDENT'S NAME:	TEST #: 11
COURSE:	P.O. #: 2.6
DATE:	STANDARD: 80%
TEACHER'S NAME:	PERFORMANCE LEVEL:

EFFECTIVE RELATIONSHIPS CHECKLIST

	Acceptable	Unacceptable
1. Employee is courteous to fellow employees.	______	______
2. Employee is tolerant of fellow employees.	______	______
3. Employee assists fellow employees without being forced to do so.	______	______
4. Employee discusses problem situation(s) with fellow employee before involving others.	______	______
5. Employee displays concern for fellow employees.	______	______

SELECTED INSTRUCTIONAL ACTIVITIES

1. Relate to students case studies of an employee who has been dismissed for not being able to get along with co-workers (E2.6.1-E2.6.4).

2. Secure films or filmstrips relating to effective human relations to use with students (E2.6.1-E2.6.4).

SELECTED TOOLS AND MATERIALS

Case studies on employee dismissal
Instructor-prepared guidelines on employee relations
Effective Relationships Checklists (see attached)

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) You and Your Job Attitudes (2) You and Your Job Habits (3) You and Your Bosses (4) You and Your Co-Workers. Job Attitudes and Habits Series, Career Aids, Inc.

SELECTED REFERENCES

Books:
An Introduction to Agricultural Business and Industry, pp. 118-136, J. Thomas Weyant, et.al.
Human Relations in Agribusiness, pp. 71-79, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.7 Maintain effective supervisory relations with employee

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

2.7

PERFORMANCE OBJECTIVE

P2.7 Given simulated situations involving a work placement in a supervisory position, maintain effective supervisory relations with employee. Acceptable performance will be achieving an "average" rating on 80 percent of the items on checklist per instructor's evaluation of supervisory skills exhibited.

SELECTED ENABLING OBJECTIVES

E2.7.1 Identify positive work attitudes.

E2.7.2 List positive human relations skills.

E2.7.3 Describe the responsibility of a supervisor to an employee.

E2.7.4 List the expectations of a supervisor for an employee.

CRITERION-REFERENCED MEASURE

C2.7 Maintain effective supervisory relations with employee. Acceptable performance will be achieving an "average" rating on 80 percent of the items on checklist per instructor's evaluation of supervisory skills exhibited.

STUDENT'S NAME:_______________ TEST #: 12

COURSE:_______________ P.O. #: 2.7

DATE:_______________ STANDARD: 80% average rating

TEACHER'S NAME:_______________ PERFORMANCE LEVEL:_______________

SUPERVISORY RELATIONS CHECKLIST

	Rating			
As a supervisor, the student is able to:	Above Average	Average	Below Average	Unsatis- Average
1. maintain an environment among employees conducive to work.	____	____	____	____
2. provide suggestions for resolution of subordinate's differences.	____	____	____	____
3. recognize potential problem situations between an employee and co-worker(s).	____	____	____	____
4. promote a sense of belonging to each employee in a work group.	____	____	____	____
5. foster good working relationships between an employee and co-worker.	____	____	____	____
6. provide encouragement and recognition to each employee under supervision.	____	____	____	____
7. develop ways to get an employee to work successfully with co-workers.	____	____	____	____
8. provide an opportunity for subordinates to discuss human relations problems.	____	____	____	____
9. relate subordinate's concerns to superiors in a tactful manner.	____	____	____	____
10. explain to subordinates why particular policies are being followed.	____	____	____	____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss their relationships with other students and relate these experiences to a working situation (E2.7.1-E2.7.4).

2. Have students develop a list of responsibilities which a supervisor has to an employee (E2.7.3).

3. Discuss the relationship between job satisfaction and supervisory relationships (E2.7.1-E2.7.4).

SELECTED TOOLS AND MATERIALS

Supervisory Relations Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Group Instruction Handbook--Cooperative Part-time Training, pp. 100-107, Vocational Instructional Services.
Human Relations in Agribusiness, pp. 102-110, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.8 Maintain effective relations with employer/firm

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

2.8

PERFORMANCE OBJECTIVE

P2.8	Given guidelines and a placement in a natural resources management training station, maintain effective relations with employer/firm. Acceptable performance will be an "average" rating by the supervisor on 80 percent of the items on the Employee/Employer Relations Checklist.

SELECTED ENABLING OBJECTIVES

E2.8.1	Explain the importance of positive work attitudes.
E2.8.2	List four positive human relations skills.
E2.8.3	Explain the role of an employer to an employee.
E2.8.4	Describe the responsibility of a worker to his or her supervisor.
E2.8.5	Describe the responsibility of a worker to the employing business.

CRITERION-REFERENCED MEASURE

C2.8	Maintain effective relations with employer/firm. Acceptable performance will be an "average" rating by the supervisor on 80 percent of the items on the Employee/Employer Relations Checklist (Test #13).

STUDENT'S NAME: ____________________

COURSE: ____________________

DATE: ____________________

TEACHER'S NAME: ____________________

TEST #: 13

P.O. #: 2.8

STANDARD: 80% average rating

PERFORMANCE LEVEL: ________

EMPLOYEE/EMPLOYER RELATIONS CHECKLIST

	Rating			
Item	Above Average	Average	Below Average	Unsatisfactory
1. Employee is punctual and regularly shows up for work.				
2. Employee arrives mentally and physically ready for work.				
3. Employee does not abuse telephone or coffee break privileges.				
4. Employee produces an adequate volume of work.				
5. Employee produces work of acceptable quality.				
6. Employee does not overly socialize on-the-job with others.				
7. Employee demonstrates initiative in completing work assignments.				
8. Employee is able to accept supervisor's advice or assistance.				
9. Employee seeks assistance from supervisor before costly mistakes are made.				
10. Employee is supportive of employer's efforts.				

SELECTED INSTRUCTIONAL ACTIVITIES

1. Role play employee/employer conflict situations and give the students an opportunity to put themselves in the employer's role (E2.8.1-E2.8.3).

2. Draw a simplified organizational chart on the chalkboard and discuss the responsibility of supervisors for carrying out the decisions made by management (E2.8.4).

3. Have students suggest and develop a list of responsibilities which a worker has to the employer (E2.8.5).

4. Discuss the relationship between job satisfaction and employee/employer relationships (E2.8.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared guidelines on employer relations
Employee/Employer Relations Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) You and Your Bosses (2) You and Your Co-Workers. Job Attitudes and Habits Series, Career Aids, Inc.

SELECTED REFERENCES

Books:
An Introduction to Agricultural Business and Industry, pp. 118-126, J. Thomas Weyant, et.al.
Group Instruction Handbook--Cooperative Part-time Training, pp. 91-99, College Station, Texas: Vocational Instructional Services.
Human Relations in Agribusiness, pp. 102-110, John Hillison and John R. Crunkilton.
Working, Virginia Department of Education, Division of Vocational Education.

CONTENT/CONCEPT

2. DEVELOPING HUMAN RELATIONS FOR A CAREER IN NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

2.9 Make a decision, using the decision-making process

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

2.9

PERFORMANCE OBJECTIVE

P2.9 Given guidelines and classroom instruction on the decision-making process and a case study of a situation requiring action, make a decision, using the decision-making process. Acceptable performance will be achieved when the most appropriate alternative is selected, relative to the advantages and disadvantages listed, and decision selected must be judged acceptable by instructor according to guidelines.

SELECTED ENABLING OBJECTIVES

E2.9.1 Gather information on the results of a decision.

E2.9.2 List the alternative decisions.

E2.9.3 List the advantages and disadvantages of each alternative.

E2.9.4 Make the appropriate decision, based on the advantages and disadvantages of each alternative.

CRITERION-REFERENCED MEASURE

C2.9 Make a decision using the decision-making process. The most appropriate alternative should be selected, relative to the advantages and disadvantages listed, and decision selected must be judged acceptable by instructor according to guidelines.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a handout, describing the decision-making process and discuss the importance of using an organized method of decision-making (E2.9.1-E2.9.4).

2. Demonstrate the decision-making process, using a sample situation (E2.9.1-E2.9.4).

3. Present case study situations and ask students to generate alternatives, listing advantages and disadvantages of each (E2.9.1-E2.9.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on decision-making process
Instructor-prepared guidelines on decision-making
Case study situations on decision-making

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Group Instruction Handbook--Cooperative Part-time Training, College Station, Texas: Vocational Instructional Services.
Working, Virginia Department of Education, Division of Vocational Education.

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASKS/COMPETENCIES

3.1 Demonstrate ability to handle a cash transaction

3.2 Demonstrate knowledge of credit and loan application

3.3 Set up a partial budget for a natural resources enterprise

3.4 Identify facility needs for a natural resources enterprise

3.5 Maintain an accurate inventory

3.6 Demonstrate ability to keep employment records

3.7 Demonstrate knowledge of employee safety regulations and standards

3.8 Determine insurance needs

3.9 Prepare requisitions

3.10 Maintain accurate records of a natural resources enterprise

3.11 Maintain field inspection reports

3.12 Write a business letter

3.13 Maintain an organized filing system

3.14 Evaluate attitudes regarding change in work routines

3.15 Prepare a complete income and expense budget for a natural resources business or agency

3.16 Interpret a financial statement

3.17 Apply the principles of double-entry bookkeeping

3.18 Determine personnel requirements

3.19 Interview and select employees

3.20 Demonstrate training techniques

3.21 Supervise subordinate workers

3.22 Evaluate employee's performance

3.23 Develop work methods and procedures

3.24 Lay out a weekly schedule of activities for an employee

3.25 Explain working conditions under existing contract agreements

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

3.1 Demonstrate ability to handle a cash transaction

COURSE

Natural Resources Management III (8040)

3.1

PERFORMANCE OBJECTIVE

P3.1 Given a sufficient sum of money in appropriate denominations and a situation involving an item to sell, demonstrate ability to handle money by computing the state sales tax for the item price, the total price, and the amount of change to return to the buyer. Calculations must be 100 percent correct, change must be the least number of pieces of money possible, and records of the transaction must be kept and evaluated for accountability by the instructor.

SELECTED ENABLING OBJECTIVES

E3.1.1 Identify the denominations of money (1¢ - $1,000).

E3.1.2 Explain the relationship between each denomination of money.

E3.1.3 Compute the proper percentage of state sales tax and the amount of tax for each transaction.

E3.1.4 Use basic mathematics to make change.

E3.1.5 Explain how to maintain an accounting system for money handled.

CRITERION-REFERENCED MEASURE

C3.1 Demonstrate ability to handle a cash transaction by computing the state sales tax for the item price, the total price, and the amount of change to return to the buyer. Calculations must be 100 percent correct, change must be the least number of pieces of money possible, and records of the transaction must be kept and evaluated for accountability by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Present students with written or actual situations involving money and have students determine cost of item(s), amount of sales tax, total cost, and amount of change, i.e., number of pennies, dimes, quarters, half dollars, dollars, etc. (E3.1.1-E3.1.5).
2. Use play money to simulate a situation for the students to make change (E3.1.1-E3.1.5).
3. Devise several accounting systems and have students become familiar with their usage (E3.1.5).

SELECTED TOOLS AND MATERIALS

Play money

SELECTED AUDIOVISUAL MATERIALS

Game: Paying Your Way, Gregg/McGraw-Hill.
Simulation: The CA$H BOX, Fearon Pitman Publishers, Inc.

SELECTED REFERENCES

Books:
Secondary math textbook

Teaching Materials:
Using Arithmetic in Agriculture, Urbana, Illinois: Vocational Agriculture Service.

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.2 Demonstrate knowledge of credit and loan application

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management IV (8042)

3.2

PERFORMANCE OBJECTIVE

P3.2 Given a situation in which a loan would be a sound business practice and a list of the following credit principles, explain each, and identify terminology and information necessary for loan application: use credit for productive purposes; use credit where it will generate the highest return within reasonable risk limits; determine method of repayment in line with income and repayment capacity; and select a dependable lender and meet with officials to negotiate. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E3.2.1 Compile information that would be necessary to obtain a loan.

E3.2.2 Identify necessary forms and documents for loan application.

E3.2.3 Determine a method and schedule for repayment of a loan.

E3.2.4 Define terminology associated with borrowing money.

E3.2.5 Describe the various types of financing available and reasons for options.

E3.2.6 List and define three types of loans.

CRITERION-REFERENCED MEASURE

C3.2 Explain credit principles and identify terminology and information necessary for loan application with 90 percent accuracy on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Simulate a lending situation and have students role play procedures for borrowing money (E3.2.1-E3.2.4).
2. Have students examine the need for capital to finance their occupational experience programs (E3.2.1-E3.2.4).
3. Discuss the role of credit in our economy and various options (E3.2.5).
4. Invite a loan officer from a commercial lending institution to come speak to the class (E3.2.1-E3.2.6).
5. Explain credit principles, various methods available for borrowing money, and terminology associated with borrowing money (E3.2.4-E3.2.6).

SELECTED TOOLS AND MATERIALS

Handout: list of credit principles
Instructor-prepared worksheet on loan application

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Agricultural Credit, Vocational Education Productions.

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.3 Set up a partial budget for a natural resources enterprise

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

3.3

PERFORMANCE OBJECTIVE

P3.3 Given resources on budgeting and financial data prepared by the instructor as a handout, set up a partial budget for a natural resource enterprise. The partial budget should contain all the items of income and expense for a particular unit or subdivision of the total enterprise, and amounts should correspond with the partial budget figures developed by the instructor.

SELECTED ENABLING OBJECTIVES

E3.3.1 Describe the purposes and uses of a partial budget.

E3.3.2 Identify items of income and items of expense.

E3.3.3 List procedures for the preparation of a partial budget.

E3.3.4 Prepare a partial budget format.

E3.3.5 Apply mathematical skills associated with a budget.

CRITERION-REFERENCED MEASURE

C3.3 Set up a partial budget for a unit or subdivision of a natural resource enterprise that contains all the appropriate items of income and expense. Completed partial budget should correspond with 100 percent accuracy to the partial budget figures developed by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Explain the uses of a partial budget and invite a key business leader to speak to the class on the topic (E3.3.1).

2. Examine several partial budgets to determine typical items of income and expense on the board and discuss with students (E3.3.2).

3. Complete a partial budget for a unit or subdivision of a natural resources enterprise (E3.3.2-E3.3.5).

4. Have students serving on FFA committees prepare partial budgets for the activities conducted by their committee (E3.3.2-E3.3.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on budgeting/financial data

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.4 Identify facility needs for a natural resources enterprise

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

3.4

PERFORMANCE OBJECTIVE

P3.4 Given information concerning a proposed natural resources enterprise, identify the facility needs of the enterprise by developing a written plan. The plan for facilities must be approved by the instructor, must contain all of the information listed in E3.4.1-E3.4.9, and must include a map identifying location of each facility.

SELECTED ENABLING OBJECTIVES

E3.4.1 Identify purpose(s) of the proposed enterprise.

E3.4.2 Determine number of people to be accommodated at one time.

E3.4.3 List activities to be conducted individually or in groups.

E3.4.4 Determine public health and safety facilities needs.

E3.4.5 Determine refreshment, eating, and amusement needs.

E3.4.6 Determine equipment and maintenance storage needs.

E3.4.7 Determine livestock and wildlife facilities needs, if applicable.

E3.4.8 Describe the most suitable location for facilities.

E3.4.9 Identify a schedule for construction of facilities.

CRITERION-REFERENCED MEASURE

C3.4 Identify the facility needs for a proposed natural resources enterprise by developing a written plan that is approved by the instructor, contains the information in E3.4.1-E3.4.9, and includes a map identifying location of each facility.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit a natural resources enterprise and answer questions on a instructor-prepared handout concerning facility needs. Have students examine brochures of the enterprise if a field trip is not suitable (E3.4.1-E3.4.9).
2. Explain to students how to conduct a facilities-need survey for the proposed natural resources enterprise (E3.4.1-E3.4.3).
3. Construct a written plan for the facility needs of a natural resources enterprise and go over with students (E3.4.1-E3.4.9).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on facility needs
Instructor-prepared plan for facility needs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Park Planning Handbook, Monty L. Christiansen.

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.5 Maintain an accurate inventory

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

3.5

PERFORMANCE OBJECTIVE

P3.5 Given a supply of materials or equipment and an instructor-prepared inventory form, maintain an inventory of 90 percent accuracy when compared to the official inventory prepared by the instructor.

SELECTED ENABLING OBJECTIVES

E3.5.1 Explain the importance of inventory control.

E3.5.2 Develop a materials or equipment identification system.

E3.5.3 Construct an inventory form.

E3.5.4 Describe a procedure for conducting an inventory.

E3.5.5 Conduct an inventory, using appropriate equipment.

E3.5.6 Maintain proper records of the inventory.

E3.5.7 Define terminology associated with maintaining an inventory.

E3.5.8 Apply mathematical skills associated with inventory.

CRITERION-REFERENCED MEASURE

C3.5 Maintain an inventory of 90 percent accuracy when compared to the official inventory prepared by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the objectives of an inventory (E3.5.1).
2. Have students construct an inventory form (E3.5.3).
3. Have students inventory the laboratory supply room (E3.5.1-E3.5.6).
4. Conduct an FFA sales campaign and have students maintain an accurate inventory of the products (E3.5.1-E3.5.7).
5. Arrange for students to conduct an inventory at a local natural resources management business or agency (E3.5.1-E3.5.8).

SELECTED TOOLS AND MATERIALS

Instructor-prepared inventory form
Specialized inventory-taking equipment
Calculator
Copy of departmental inventory
Typewriter

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

3.6 Demonstrate ability to keep employment records

COURSE

Natural Resources Management V (8044)

3.6

PERFORMANCE OBJECTIVE

P3.6 Given written guidelines and an example of a work situation involving five employees and information regarding their wages per hour, number of hours worked, their withholding requirements, and tax withholding tables, demonstrate ability to keep employment records and to compute employee payroll. Employment records must include those required by the government and firm, and they must correspond with 100 percent accuracy to those guidelines prepared by the instructor. Payroll calculations for gross and net pay must have 100 percent accuracy.

SELECTED ENABLING OBJECTIVES

E3.6.1 List employment records that are necessary to keep.

E3.6.2 Explain rules and regulations concerning employment records.

E3.6.3 Prepare employees' payroll checks and records of deposits made to Social Security, federal income tax, state income tax, worker's compensation, profit sharing plans, etc.

E3.6.4 Record and prepare detailed statements for employer, employee, and government agencies.

E3.6.5 Define terminology associated with keeping employment records.

E3.6.6 Apply mathematical skills associated with keeping employment records.

CRITERION-REFERENCED MEASURE

C3.6 Demonstrate ability to keep employment records and to compute employee payroll. Employment records must include those required by the government and firm, and they must correspond with 100 percent accuracy to those guidelines prepared by the instructor. Payroll calculations for gross and net pay must have 100 percent accuracy.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a case study involving the employment records needed by a natural resources business or agency. Have students transfer information to the appropriate forms for each employee (P3.6).

2. Visit a natural resources business or agency to observe the employment records (P3.6).

3. Have students organize a natural resources business or agency and keep the necessary employment records (E3.6.1-E3.6.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared guidelines for employment records
Case study involving employment records
Data for employee payroll
Calculator
Case study information for natural resources business or agency
Income tax guides
Payroll forms (Social Security, Federal Income Tax, State Income Tax, Worker's Compensation, Profit-Sharing Plans, etc.)
Payroll/tax literature with rules and regulations outlines
Record books
Typewriter

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

3.7 Demonstrate knowledge of employee safety regulations and standards

COURSE

Natural Resources Management V (8044)

3.7

PERFORMANCE OBJECTIVE

P3.7 Given a role-play situation involving safety violations and enforcement guidelines, demonstrate knowledge of employee safety regulations and standards. Participation must be judged acceptable according to guidelines provided.

SELECTED ENABLING OBJECTIVES

E3.7.1 List applicable federal, state, and local laws pertaining to employee safety.

E3.7.2 Identify employer's policies and practices pertaining to employee safety.

E3.7.3 Determine case situations where a law or policy applies.

E3.7.4 Explain procedure to inform employees tactfully of their inappropriate behavior or action.

E3.7.5 Explain procedure to instruct employees on the correct procedure to follow for a specific task.

E3.7.6 Observe employees to determine whether safety practices are followed.

CRITERION-REFERENCED MEASURE

C3.7 Demonstrate knowledge of employee safety regulations and standards. Participation must be judged acceptable according to guidelines provided.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Develop several role-play situations requiring the enforcement of employee safety regulations and standards (E3.7.1-E3.7.6).
2. Have students determine applicable laws for a situation (E3.7.1).
3. Have students discuss their employer's policies and practices regarding employee safety (E3.7.2).
4. Have students role play the employer or supervisor that must inform an employee of an infraction (E3.7.3, E3.7.4).
5. Discuss with students corrective measures that should be taken to remedy a problem situation (E3.7.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared material for role-play on safety regulations

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: School Shop Safety, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.8 Determine insurance needs

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

3.8

PERFORMANCE OBJECTIVE

P3.8 Given guidelines for insurance coverage, an example of a natural resources enterprise, and information regarding liabilities and assets, determine the insurance needs of the natural resources business or agency. Insurance purchased must be adequate for the type of risks involved with the business or agency and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E3.8.1 Explain the risk and exposure to liabilities and accidents covered by insurance.

E3.8.2 Determine value of business or agency.

E3.8.3 Evaluate limits of liability needs.

E3.8.4 Identify and compare available insurance rates and coverage.

E3.8.5 Explain different interpretations of insurance coverage from each company consulted.

E3.8.6 Determine the amount of adequate coverage that should be purchased.

E3.8.7 Define terminology associated with insurance.

E3.8.8 Apply mathematical skills associated with insurance.

CRITERION-REFERENCED MEASURE

C3.8 Determine the insurance needs of a natural resources business or agency. Insurance purchased must be adequate for the type of risks involved with the business or agency and be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a list of possible events in which a natural resources business or agency could be held liable (E3.8.1).

2. Have students estimate the value of the business or agency (E3.8.2).

3. Invite an insurance broker to speak to class concerning insurance needs for the business or agency (E3.8.1-E3.8.7).

4. Have each student determine the appropriate amount of insurance to purchase and secure bids from several companies (E3.8.1-E3.8.8).

SELECTED TOOLS AND MATERIALS

Calculator
Instructor-prepared guidelines on insurance coverage
Instructor-prepared checklist on determining insurance needs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.9 Prepare requisitions

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

3.9

PERFORMANCE OBJECTIVE

P3.9 Given a situation involving a natural resources enterprise, appropriate data, and the necessary forms, prepare requisitions required by the natural resources business or agency. Each form prepared should correspond with 100 percent accuracy to the master requisition form prepared by the instructor.

SELECTED ENABLING OBJECTIVES

E3.9.1 Determine data needed in order to prepare a specific requisition.

E3.9.2 Secure additional information, if needed, in order to complete the requisition.

E3.9.3 Write legibly or type the necessary information on the requisition.

E3.9.4 Obtain appropriate signatures and/or authorizations.

E3.9.5 File copies of requisition in appropriate location before and after receiving merchandise.

E3.9.6 Follow up requisition if merchandise is not received within allotted time frame.

E3.9.7 Define terminology associated with requisitions.

E3.9.8 Apply mathematical skills associated with requisitions.

CRITERION-REFERENCED MEASURE

C3.9 Prepare requisitions required by a natural resources business or agency. Each form prepared should correspond with 100 percent accuracy to the master requisition form prepared by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Simulate purchases by a natural resources business or agency and have students prepare requisitions (E3.9.1-E3.9.6).

2. Have students work in school office or other setting requiring preparation of requisitions and other records (E3.9.1-E3.9.8).

3. Have students placed in a supervised work experience program prepare requisitions (E3.9.1-E3.9.8).

SELECTED TOOLS AND MATERIALS

Calculator
Typewriter
Requisition forms
Instructor-prepared master requisition form

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT
3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM
AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY
3.10 Maintain accurate records of a natural resources enterprise

COURSE
Natural Resources Management V
(8044)

3.10

PERFORMANCE OBJECTIVE

P3.10 Given reporting guidelines and appropriate reports required by a natural resources business or agency, maintain accurate records for a natural resource enterprise. Completed records must be acceptable according to instructor-prepared checklist on reporting.

SELECTED ENABLING OBJECTIVES

E3.10.1 Examine the reports required by a natural resources business or agency to determine types of data to be collected.

E3.10.2 Identify schedule for recording data and completing summary forms and reports.

E3.10.3 Determine long- and/or short-range need for specific records.

E3.10.4 Fill out forms correctly by entering data or information in appropriate locations.

E3.10.5 Demonstrate use of correct grammar, vocabulary, and spelling.

E3.10.6 Apply mathematical skills associated with recordkeeping.

CRITERION-REFERENCED MEASURE

C3.10 Maintain accurate records for a natural resource enterprise. Completed records must be acceptable according to instructor-prepared checklist on reporting.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Collect a copy of all records, forms, or reports kept by a natural resources business or agency. Have students examine this material to determine appropriateness for a specific natural resources enterprise (E3.10.1).

2. Provide case-study data and have students keep the records needed by the natural resources enterprise (E3.10.1-E3.10.6).

3. Have students compare their completed reports with master forms prepared by the instructor and correct forms accordingly (E3.10.5).

SELECTED TOOLS AND MATERIALS

Calculator
Typewriter
Reporting forms for natural resources enterprise
Instructor-prepared reporting guidelines
Instructor-prepared master requisition form
Instructor-prepared case study data

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.11 Maintain field inspection reports

COURSE

Natural Resources Management V
(8044)

3.11

PERFORMANCE OBJECTIVE

P3.11 Given appropriate format and reports for managing a natural resources business or agency, maintain field inspection reports. Reports must be judged acceptable by the instructor and must meet the following criteria: accurate contents, timeliness and legibility, and adherence to format provided.

SELECTED ENABLING OBJECTIVES

E3.11.1 Identify field inspection reports to be kept for a natural resources business or agency.

E3.11.2 Describe typical comments and terminology included in field inspection reports.

E3.11.3 Identify a schedule for completing field inspection reports.

E3.11.4 Record content accurately in writing field inspection reports.

E3.11.5 Develop and maintain a filing system for field inspection reports.

E3.11.6 Write legibly or type.

E3.11.7 Demonstrate use of correct grammar, vocabulary, and spelling.

E3.11.8 Apply mathematical skills required within the field inspection reports.

CRITERION-REFERENCED MEASURE

C3.11 Maintain field inspection reports. The report must be judged acceptable by the instructor and must meet the following criteria: accurate contents, timeliness and legibility, and adherence to format provided.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine different types of field inspection reports to determine content and format used (E3.11.1, E3.11.2).

2. Give students a set of typical field notes and have them write a field inspection report from the notes. Let the students compare their version with a version written by a professional employed in the field (E3.11.1-E3.11.6).

3. Have a speaker from a natural resources business or agency discuss the preparation and maintenance of field reports with the class (E3.11.1-E3.11.8).

SELECTED TOOLS AND MATERIALS

Field inspection report forms and field notes
Instructor-prepared field inspection report format
Examples of field notes

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.12 Write a business letter

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

3.12

PERFORMANCE OBJECTIVE

P3.12 Given a simulated situation requiring a written letter of response, write a business letter. Acceptable performance will be an acceptable rating on 90 percent of the items on the Business Letter Checklist.

SELECTED ENABLING OBJECTIVES

E3.12.1 List the components of a business letter.

E3.12.2 Explain correct business letter style and form.

E3.12.3 Identify parts of a letter.

E3.12.4 Describe messages that are appropriate in a letter.

E3.12.5 Type letter with five or less corrections.

E3.12.6 Define terminology associated with writing business letters.

CRITERION-REFERENCED MEASURE

C3.12 Write a business letter. Acceptable performance will be an acceptable rating on 90 percent of the items on the Business Letter Checklist (Test #14).

STUDENT'S NAME: ____________________ TEST #: 14

COURSE: ____________________ P.O. #: 3.12

DATE: ____________________ STANDARD: 90%

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: ________

BUSINESS LETTER CHECKLIST

	INSTRUCTOR'S RATING	
	ACCEPTABLE	UNACCEPTABLE
Used business letter style and form.	______	______
Organized letter properly.	______	______
Used tact and courtesy.	______	______
Included proper information.	______	______
Used spelling and grammar correctly.	______	______
Letter accomplished the purpose for which it was intended.	______	______
Letter was neatly typed.	______	______
Letter was properly signed.	______	______

SELECTED INSTRUCTIONAL ACTIVITIES

1. Review components of a business letter with the students (E3.12.1, E3.12.6).
2. Invite business education or English teacher to class to review business letter form with students (E3.12.2).
3. Have natural resources management students write business letters as they are needed by the FFA chapter and use the best ones for mailing (E3.12.1-E3.12.6).
4. Have a business letter-writing contest for students with recognition given for all letters meeting an acceptable standard (E3.12.1-E3.12.6).

SELECTED TOOLS AND MATERIALS

Typewriter
Business Letter Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Secondary grammar textbook

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.13 Maintain an organized filing system

COURSE

Natural Resources Management V
(8044)

3.13

PERFORMANCE OBJECTIVE

P3.13 Given an organized filing system and guidelines on filing, maintain the files during a series of filing exercises. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E3.13.1 Identify systems used for filing.

E3.13.2 Select a filing system for a particular situation.

E3.13.3 Maintain files by adding or deleting information needed to keep them up to date.

E3.13.4 Explain the organizational skills that are required for filing.

CRITERION-REFERENCED MEASURE

C3.13 Maintain an organized filing system during a series of filing exercises. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Establish a well organized filing system of resource materials within the agricultural classroom (E3.13.1).

2. Explain the filing system to the students and make assignments that require its use (E3.13.1-E3,13.4).

3. Have students file materials using the file system and determine accuracy achieved in placement of materials (E3.13.3, E3.13.4).

4. Organize FFA resource materials in a filing system, e.g., AGDEX, and have students use and maintain the file (E3.13.1-E3.13.4).

SELECTED TOOLS AND MATERIALS

Filing cabinet with resource materials
Instructor-prepared filing exercise
Instructor-prepared checklist on filing

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.14 Evaluate attitudes regarding change in work routines

COURSE

Natural Resources Management V
(8044)

3.14

PERFORMANCE OBJECTIVE

P3.14 Given information on the importance of adapting to change, methods for dealing with change, and the Adapting to Change checklist, evaluate attitudes regarding change in work routines by completing the checklist. Acceptable performance will be completion of all items on the checklist to increase self-awareness.

SELECTED ENABLING OBJECTIVES

E3.14.1 Explain the importance of adaptive behavior in the work role.

E3.14.2 Describe factors and situations which require adaptive behavior.

E3.14.3 Identify several methods for dealing with changing situations on the job.

E3.14.4 Describe methods to facilitate change on the job.

E3.14.5 Explain how an individual's personality affects change on the job.

CRITERION-REFERENCED MEASURE

C3.14 Evaluate attitudes regarding change in work routines by completing the checklist, Adapting to Change (Test #15). Acceptable performance will be completion of all items on the checklist to increase self-awareness.

STUDENT'S NAME: ____________ TEST #: 15

COURSE: ____________ P.O. #: 3.14

DATE: ____________ STANDARD: Completion

TEACHER'S NAME: ____________ PERFORMANCE LEVEL: ______

ADAPTING TO CHANGE CHECKLIST

Key: 0--Strongly Disagree 1--Disagree 2--Partly Disagree 3--Partly Agree
4--Agree 5--Strongly Agree

	STUDENT'S RATING					
ITEM	SD	D	PD	PA	A	SA
1. I like my job just the way it is now.	0	1	2	3	4	5
2. I am always eager to learn about new developments.	0	1	2	3	4	5
3. If I like things the way they are, I see no reason for making changes.	0	1	2	3	4	5
4. As soon as I hear about something new for my job, I like to try it.	0	1	2	3	4	5
5. When it comes to using new methods of doing things, I prefer to be a follower rather than a leader.	0	1	2	3	4	5
6. I have made many suggestions to my supervisor to improve my job.	0	1	2	3	4	5
7. I always try to keep myself up to date.	0	1	2	3	4	5
8. Years of experience have made things the way they are--they're dependable.	0	1	2	3	4	5
9. Making changes creates too many problems and pressures; I'd rather relax and enjoy what I have.	0	1	2	3	4	5
10. I do not enjoy major changes in my job duties every few days.	0	1	2	3	4	5

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the definition and meaning of adaptive behavior (E3.14.1).
2. List on the chalkboard situations relative to employment that might require a change in attitude and/or behavior (E3.14.2, E3.14.3).
3. Have students interview several other employed students and an employer to discover problems arising on the job (E3.14.3).
4. Have students develop a list of factors that require change on the job (E3.14.4).
5. Have students role play situations requiring adaptive behavior and conduct a self-evaluation (E3.14.1-E3.14.5).

SELECTED TOOLS AND MATERIALS

Adapting to Change Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Working, Virginia Department of Education, Division of Vocational Education.

Application

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.15 Prepare a complete income and expense budget for a natural resources business or agency

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

3.15

PERFORMANCE OBJECTIVE

Pe.15 Given a budget format and the necessary income and expense data for a natural resources business or agency, prepare a complete income and expense budget. Acceptable performance will be achieved if all items of income and expense are included in the budget, and budget must be balanced and set up according to instructor-prepared format.

SELECTED ENABLING OBJECTIVES

E3.15.1 Identify items of income and items of expense.

E3.15.2 Explain the purposes and uses of an income and expense budget.

E3.15.3 List procedures for the preparation of an income and expense budget.

E3.15.4 Prepare a budget format.

E3.15.5 Define terminology associated with an income and expense budget.

E3.15.6 Apply mathematical skills associated with a budget.

CRITERION-REFERENCED MEASURE

C3.15 Prepare a complete income and expense budget, using all of the income and expense items for a natural resources business or agency. The budget must be balanced and set up according to instructor-prepared format.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss the purposes and uses of a budget (E3.15.1).
2. List on the chalkboard the procedures for preparing a budget and the characteristics of a properly prepared budget (E3.15.1-E3.15.6).
3. Obtain and discuss a sample budget for a local natural resources business or agency (E3.15.1-E3.15.4).
4. Provide financial information for a natural resources business or agency and have students prepare a budget (P3.15).

SELECTED TOOLS AND MATERIALS

Calculator
Financial information on business or agency
Sample budgets
Instructor-prepared budgetary format

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.16 Interpret a financial statement

COURSE

Postsecondary

3.16

PERFORMANCE OBJECTIVE

P3.16 Given a financial statement from a natural resources business or agency, interpret the financial statement by identifying the assets, liabilities, and net worth of the business or agency with 100 percent accuracy on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E3.16.1 Describe a financial statement.

E3.16.2 Identify the purpose of a financial statement.

E3.16.3 Explain the various components of a financial statement.

E3.16.4 Define the terms associated with a financial statement.

E3.16.5 Explain the relationship of recordkeeping and accounting to the preparation of a financial statement.

E3.16.6 Apply mathematical skills associated with a financial statement.

CRITERION-REFERENCED MEASURE

C3.16 Interpret a financial statement from a natural resorces business or agency by identifying assets, liabilities, and the firm's net worth with 100 percent accuracy on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare an overhead transparency and student handouts of a financial statement (E3.16.1).

2. Have students discuss the purpose of a financial statement and identify the information it contains (E3.16.1-E3.16.4).

3. Present the necessary financial information for a real or hypothetical business or agency and have students properly complete a financial statement (E3.16.1-E3.16.6).

SELECTED TOOLS AND MATERIALS

Instructor-prepared financial statement (handouts and transparency)
Instructor-prepared worksheet on financial statement

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.17 Apply the principles of double-entry bookkeeping

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

3.17

PERFORMANCE OBJECTIVE

P3.17 Given the financial data for a natural resources business or agency, apply the principles of double-entry bookkeeping on instructor-prepared worksheet. All figures must be recorded accurately and neatly on the proper form on worksheet, and 100 percent accuracy must be achieved.

SELECTED ENABLING OBJECTIVES

E3.17.1 Demonstrate ability to add, subtract, multiply, and divide whole numbers with decimals.

E3.17.2 Define credit, debit, double-entry bookkeeping, and other related terminology.

E3.17.3 Explain the principles of double-entry bookkeeping.

E3.17.4 Write figures neatly and legibly.

CRITERION-REFERENCED MEASURE

C3.17 Apply the principles of double-entry bookkeeping on instructor-prepared worksheet. All figures must be recorded accurately and neatly on the proper form on worksheet, and 100 percent accuracy must be achieved.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the principles of double-entry bookkeeping (E3.17.2).
2. Have students record credits and debits, using a system of double-entry bookkeeping (E3.17.1-E3.17.4).
3. Use an FFA sales campaign to demonstrate a system of double-entry bookkeeping (E3.17.1-E3.17.4).
4. Test student's math skills and assign remedial math work if necessary (E3.17.1).
5. Invite the business education teacher to class to discuss the principles of double-entry bookkeeping (E3.17.3).

SELECTED TOOLS AND MATERIALS

Calculator
Financial data for bookkeeping
Instructor-prepared worksheet on double-entry bookkeeping

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.18 Determine personnel requirements

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

3.18

PERFORMANCE OBJECTIVE

P3.18 Given guidelines for writing a plan and information regarding the mission, scope, and budget of a natural resources business or agency, determine the personnel requirements necessary to operate the business or agency adequately by writing a plan to justify personnel. The plan must adhere to guidelines and meet the following criteria: reflect mission and scope of business; correspond to budget information; address specialization needs of personnel to meet mission; and reflect personnel staffing of similar-sized agencies.

SELECTED ENABLING OBJECTIVES

E3.18.1 Explain mission statement, scope, and budget and determine its impact upon business or agency hiring practices.

E3.18.2 Identify agency or firm's need for specialized personnel.

E3.18.3 List duties of persons to be employed by business or agency.

E3.18.4 Develop a written personnel plan that includes budgeting information.

E3.18.5 Write job descriptions for each position recommended.

CRITERION-REFERENCED MEASURE

C3.18 Determine the personnel requirements necessary to operate adequately a natural resources business or agency by writing a plan to justify personnel. The plan must adhere to guidelines and meet the following criteria: reflect mission and scope of business; correspond to budget information; address specialization needs of personnel to meet mission; and reflect personnel staffing of similar-sized agencies.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide students with a simulated business or agency situation and have them develop personnel requirements of the business or agency (E3.18.1-E3.18.5).

2. Have students prepare the written plan detailing personnel requirements (E3.18.4).

3. Visit a similar or the actual business or agency used in the example to allow students to compare their personnel requirements plan with an existing situation (E3.18.1-E3.18.5).

SELECTED TOOLS AND MATERIALS

Case-study information for natural resources business or agency

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.19 Interview and select employees

COURSE

Postsecondary

3.19

PERFORMANCE OBJECTIVE

P3.19 Given an assessment of labor needed in a natural resources agency or business, the competencies required, and applications of potential employee(s), interview and select employees in a role play simulating application review and personal interviews. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E3.19.1 Determine the amount of labor needed.

E3.19.2 Assess degree of competency required.

E3.19.3 Review applications of prospective employees.

E3.19.4 Interview prospective employee(s).

E3.19.5 Complete necessary paperwork needed to hire employee.

E3.19.6 Demonstrate ability to inform other applicants of decision made.

CRITERION-REFERENCED MEASURE

C3.19 Interview and select employees in role play simulating application review and personal interviews. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide students with a simulated natural resources business or agency situation requiring the hiring of employees (E3.19.1-E3.19.6).
2. Have students determine the competencies required by a specific job (E3.19.1, E3.19.2).
3. Discuss how to review and rate employment applications that are submitted to a business or agency (E3.19.3).
4. Have students (or an employer) role play the interviewer and interviewee roles and discuss strengths and weaknesses of the interview (E3.19.4).
5. Have students fill out forms required by the business or agency of the interviewee and the interviewer (E3.19.5, E3.19.6).

SELECTED TOOLS AND MATERIALS

Case-study information for natural resources business or agency
Instructor-prepared checklist on interviewing and selecting employees

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.20 Demonstrate training techniques

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

3.20

PERFORMANCE OBJECTIVE

P3.20 Given a case study with a description of a worker's background and experience and a role-play situation, demonstrate training techniques for tasks and competencies required for a specific job. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E3.20.1 Determine worker's background and experience.

E3.20.2 Select task for which skill is lacking.

E3.20.3 Demonstrate ability to perform the task.

E3.20.4 Evaluate worker's performance in demonstrating the task.

E3.20.5 Determine if re-training is necessary.

E3.20.6 Repeat procedure for remainder of tasks.

CRITERION-REFERENCED MEASURE

C3.20 Demonstrate training techniques for tasks and competencies required for a specific job. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Use peer teaching whenever the situation is appropriate, especially when a student needs individualized instruction on a competency and another student is proficient on that particular competency (E3.20.1-E3.20.6).

2. Have students role play training workers for a particular competency and have the class evaluate the quality of training given (E3.20.1-E3.20.6).

3. Visit a training session at a nearby natural resources business or agency and have students discuss the procedures used by the trainer (E3.20.1-E3.20.6).

SELECTED TOOLS AND MATERIALS

Case-study information for natural resources business or agency
Current agriculture periodicals and magazines
Instructor-prepared checklist on demonstrating training techniques

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.21 Supervise subordinate workers

COURSE

Postsecondary

3.21

PERFORMANCE OBJECTIVE

P3.21 Given an actual or simulated supervisory position, supervise subordinate workers. Acceptable performance will be achieving an "average" rating on 80 percent of the items on the checklist, per instructor's or placement supervisor's evaluation of supervisory ability.

SELECTED ENABLING OBJECTIVES

E3.21.1 Explain the importance of developing positive work attitudes for yourself and in others.

E3.21.2 Identify components of positive interpersonal skills.

E3.21.3 Describe the responsibility of a supervisor to an employee.

E3.21.4 List the expectations of a supervisor for an employee.

CRITERION-REFERENCED MEASURE

C3.21 Supervise subordinate workers in an actual or simulated supervisory position. Acceptable performance will be achieving an "average" rating on 80 percent of the items on the checklist, per instructor's or supervisor's evaluation of supervisory ability.

STUDENT'S NAME:______________________________ TEST #: 16

COURSE:______________________________ P.O. #: 3.21

DATE:______________________________ STANDARD: 80% average rating

TEACHER'S NAME:______________________________ PERFORMANCE LEVEL:__________

SUPERVISORY RELATIONS CHECKLIST

Item	Rating Above Average	 Average	 Below Average	 Unsatisfactory
As a supervisor, the student is able to:				
1. maintain an environment among employees conducive to work.	____	____	____	____
2. provide suggestions for resolution of subordinate's difference.	____	____	____	____
3. recognize potential problem situations between an employee and co-worker(s).	____	____	____	____
4. promote a sense of belonging to each employee in a work group.	____	____	____	____
5. foster good working relationships between an employee and co-worker.	____	____	____	____
6. provide encouragement and recognition to each employee under supervision.	____	____	____	____
7. develop ways to get an employee to work successfully with co-workers.	____	____	____	____
8. provide an opportunity for subordinates to discuss human relations problems.	____	____	____	____
9. relate subordinate's concerns to superiors in a tactful manner.	____	____	____	____
10. explain to subordinates why particular policies are being followed.	____	____	____	____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss their relationships with other students and relate this experience to a working situation (E3.21.1-E3.21.4).

2. Have students develop a list of responsibilities a supervisor has to an employee (E3.21.3).

3. Discuss the relationship between job satisfaction and supervisory relationships (E3.21.1-E3.21.4).

SELECTED TOOLS AND MATERIALS

Supervisory Relations Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

Group Instruction Handbook--Cooperative Part-time Training, pp. 100-107, College Station, Texas: Vocational Instructional Services.

Human Relations in Agribusiness, pp. 102-110, John Hillison and John R. Crunkilton.

Working, Virginia Department of Education, Division of Vocational Education.

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

3.22 Evaluate employee's performance

COURSE

Postsecondary

3.22

PERFORMANCE OBJECTIVE

P3.22 Given an actual or simulated supervisory role, evaluate an employee's performance in a work situation. Acceptable peformance will be 70 percent congruence with the instructor's or supervisor's evaluation of the same employee, using an instructor-prepared employee evaluation form.

SELECTED ENABLING OBJECTIVES

E3.22.1 Describe the role of a supervisor in evaluating the performance of an employee.

E3.22.2 Analyze the employee's performance in relation to each item on the evaluation form.

E3.22.3 Complete the evaluation form accurately.

CRITERION-REFERENCED MEASURE

C3.22 Evaluate an employee's performance in a work situation by achieving 70 percent congruence with the instructor's or supervisor's evaluation of the same employee, using an instructor-prepared employee evaluation form.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare and distribute copies of an evaluation form and discuss each item with the students (E3.22.1-E3.22.3).
2. Have students evaluate an employee (E3.22.1-E3.22.3).
3. Compare students' evaluations with results of an official evaluation done by the instructor or supervisor and discuss differences (E3.22.1-E3.22.3).
4. Have students evaluate their own work performance over a given time period and discuss the results with their instructor (E3.22.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared employee evaluation form

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.23 Develop work methods and procedures

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Postsecondary

3.23

PERFORMANCE OBJECTIVE

P3.23 Given resources on policies for managing a natural resources business or agency and an example of a specific task to be performed, develop work methods and procedures for personnel performing the task by writing a plan outlining these methods and procedures. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E3.23.1 Identify the task to be performed by a worker.

E3.23.2 List the methods or procedures to be followed in completing the task.

E3.23.3 Explain the methods or procedures used to determine efficiency and effectiveness.

E3.23.4 Identify the importance of revising the methods or procedures when necessary and especially when updated equipment or technology is implemented.

CRITERION-REFERENCED MEASURE

C3.23 Develop work methods and procedures for personnel of a natural resources business or agency performing a specific task by writing a plan outlining these methods and procedures. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students select a task that must be performed by a worker in a natural resources business or agency (E3.23.1).
2. Have students research the task to determime its component parts (E3.23.2).
3. Have students devise a written plan that details the methods and procedures to be used by the worker to accomplish the task (E3.23.2).
4. Have students observe a worker performing the task to determine appropriateness of their written plan (E3.23.3).
5. Have students revise their written plans based upon the worker observation (E3.23.4).
6. Have students observe a particular task performed in the agricultural mechanics laboratory and prepare a written suggested procedures plan for the task (E3.23.1-E3.23.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on work methods and procedures

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES BUSINESS OR AGENCY

TASK/COMPETENCY

3.24 Lay out a weekly schedule of activities for an employee

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

3.24

PERFORMANCE OBJECTIVE

P3.24 Given a role-play situation, a specific occupation, a job description for the occupation, and the goals for a business, lay out a written weekly schedule of activities for an employee. The schedule must be understood by an employee (role-played by another student) and judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E3.24.1 Identify the component parts or tasks of a job.

E3.24.2 Organize the tasks into a logical sequence.

E3.24.3 Estimate the amount of time required for each task.

E3.24.4 Identify the adequate amount of time for the completion of each task, including lunch and breaks.

E3.24.5 Complete a written form that lists the weekly schedule of activities for the employee.

CRITERION-REFERENCED MEASURE

C3.24 Lay out a written weekly work schedule for an employee that is understood by the employee (in a role-play situation) and judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Organize the class into a simulated natural resources management business or agency and have students play the role of employees in supervisory or managerial positions. The supervisor or manager will review the jobs to be completed for the week and determine their complexity. The supervisor or manager will list the jobs along with an estimate of time on a schedule of activities form (E3.24.1-E3.24.5).

2. Visit a natural resources management business or agency and observe people working in supervisory or managerial positions who are assigning work schedules (E3.24.1-E3.24.5).

3. Have students conduct telephone interviews of natural resources management supervisory or managerial personnel concerning the development of daily and weekly schedules (E3.24.5).

SELECTED TOOLS AND MATERIALS

Schedule of activities form
Telephone
Instructor-prepared checklist on scheduling

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

3. MANAGING A NATURAL RESOURCES

PROGRAM

AGRICULTURAL RESOURCES

TASK/COMPETENCY

3.25 Explain working conditions under existing contract agreements

COURSE

Postsecondary

3.25

PERFORMANCE OBJECTIVE

P3.25 Given a copy of an employee contract, explain working conditions under the existing contract agreements. Acceptable peformance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E3.25.1 Describe provisions of the employees' contract.

E3.25.2 Identify working conditions that are covered by the contract.

E3.25.3 Determine whether working conditions are compatible with contract agreements.

E3.25.4 Explain procedure to be followed if working conditions and contract agreements are not in compliance.

E3.25.5 Explain the need for flexibility within a contract for the employer's and employees' advantage.

CRITERION-REFERENCED MEASURE

C3.25 Explain working conditions under the existing agreements for an employee contract. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Examine and discuss several examples of employee contracts (E3.25.1, E3.25.2).

2. Have students give examples of working conditions that are covered by contract agreement (E3.25.2).

3. Have students role play several working condition situations, including some that are in violation of contract agreements, and discuss compliance issues (E3.25.1-E3.25.4).

4. Invite a union representative and a management representative to speak to the class regarding pros and cons of contract agreement specificity (E3.25.5).

SELECTED TOOLS AND MATERIALS

Samples of employee contracts
Instructor-prepared worksheet on employee contracts

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/ CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

TASKS/COMPETENCIES

4.1 Determine most effective methods of promoting natural resources enterprises

4.2 Develop a public relations program for a specific enterprise

4.3 Write newspaper advertisements and articles for publication

4.4 Prepare a natural resources enterprise exhibit

4.5 Present demonstrations to promote a natural resources enterprises

4.6 Demonstrate knowledge of broadcast promotions

4.7 Assist in conducting tours

4.8 Address audience interested in natural resources

Application

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

4.1 Determine most effective methods of promoting natural resources enterprises

COURSE

Natural Resources Management V
(8044)

4.1

PERFORMANCE OBJECTIVE

P4.1 Given the need to advertise and promote natural resources enterprises, determine the most effective methods of promoting natural resources enterprises by compiling a list of promotional methods. The list must include at least 12 methods and 2 advantages and 2 disadvantages for each method, and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.1.1 List methods for promoting natural resources enterprises.

E4.1.2 Conduct research on the effectiveness of a promotional method.

E4.1.3 Define terminiology associated with methods of promotion.

CRITERION-REFERENCED MEASURE

C4.1 Determine the most effective methods of promoting natural resources enterprises by compiling a list of promotional methods. The list must include at least 12 methods and 2 advantages and 2 disadvantages for each method, and be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students keep a log for a specified period of time in which they note the methods they observed to promote natural resources enterprises (E4.1.1-E4.1.3).
2. Prepare a chart that includes the promotional method, its advantages and disadvantages, and its cost (E4.1.1-E4.1.3).
3. Prepare three different brochure covers and monitor which brochure is most frequently selected by a visitor (E4.1.1-E4.1.3).
4. Have small groups of students select one aspect of a natural resources enterprise, e.g., one exhibit, and have them develop two methods of promotion and monitor the effectiveness of each method (E4.1.1-E4.1.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on promotion
Instructor-prepared chart for promotion
Instructor-prepared brochures on promotion

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Selling and Salesmanship for Agricultural Products, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

TASK/COMPETENCY

4.2 Develop a public relations program for a specific enterprise

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

4.2

PERFORMANCE OBJECTIVE

P4.2 Given an example of a specific natural resources enterprise, develop a public relations program for the enterprise. Acceptable peformance will include a sample of each of the following in the program: newspaper advertisement; newspaper article; brochure; radio announcement; poster/flyer; and a billboard advertisement. All samples must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.2.1 Identify the need for a public relations program for the enterprise.

E4.2.2 Determine available resources that can be committed to the public relations program.

E4.2.3 Identify the items to be used in the public relations campaign.

E4.2.4 Produce items needed for the public relations program or arrange for their production.

E4.2.5 Explain how to properly conduct a public relations program.

E4.2.6 Identify methods used to assess effectiveness of a public relations program.

CRITERION-REFERENCED MEASURE

C4.2 Develop a public relations program for the enterprise. Acceptable performance will include a sample of each of the following in the program: newspaper advertisement; newspaper article; brochure; radio announcement; poster/flyer; and billboard advertisement. All samples must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit a natural resources business or agency to examine the public relations program being conducted. Students should try to collect sample materials as well as gather ideas (E4.2.1-E4.2.6).

2. Have students discuss the various ways that one might promote a specific enterprise. Then let students select the public relations method for which they would develop the supporting material needed (E4.2.1-E4.2.6).

3. Invite a public relations or public information specialist for a natural resources business or agency to speak to the class (E4.2.1-E4.2.6).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on public relations

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Advertising and Promotion of Agricultural Products, Ohio Agricultural Education Curriculum Materials Service.
Preparing Directories to Local Outdoor Recreation Facilities, USDA, Forest Service.
Working with the Press, USDA, Forest Service.

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

TASK/COMPETENCY

4.3 Write newspaper advertisements and articles for publication

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

4.3

PERFORMANCE OBJECTIVE

P4.3 Given an example of a natural resources enterprise to advertise and promote and guidelines for publication, write newspaper advertisements and articles for publication. Acceptable performance will be achieved when one advertisement and one article are written according to guidelines and both are rated acceptable for printing according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.3.1 Select a newspaper with the appropriate subscribing audience.

E4.3.2 Identify a needed advertisement or article.

E4.3.3 Prepare advertisement or article for publication.

E4.3.4 Select the best location within the newspaper for the advertisement.

E4.3.5 Explain how to use a cost-effective amount of space for the advertisement.

E4.3.6 Use correct format for submission of newspaper article.

E4.3.7 Use correct grammar, spelling, and vocabulary.

E4.3.8 Define terminology associated with newspapers.

CRITERION-REFERENCED MEASURE

C4.3 Write newspaper advertisements and articles for publication. Acceptable performance will be achieved when one advertisement and one article are written according to guidelines and both are rated acceptable for printing according to instructor-prepared guidelines.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine local newspapers for examples of advertisements and articles submitted by natural resource management businesses or agencies (E4.3.1-E4.3.8).

2. Have students design an advertising layout for a natural resource management business or agency (E4.3.3).

3. Have students explain how to advertise an appropriate FFA activity or place an appropriate personal advertisement in the newspaper (E4.3.1-E4.3.5).

4. Have students prepare newspaper articles describing a natural resource business or agency or an appropriate FFA activity (E4.3.2, E4.3.3).

5. Invite a local newspaper columnist to discuss the preparation of advertisements and articles (E4.3.1-E4.3.8).

SELECTED TOOLS AND MATERIALS

Local newspapers
Instructor-prepared checklist on promotion

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Advertising and Promotion of Agricultural Products, Ohio Agricultural Education Curriculum Materials Service.
How to Make a Good Ad Better, Newspaper Advertising Bureau.
Working with the Press, USDA, Forest Service.

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

TASK/COMPETENCY

4.4 Prepare a natural resources enterprise exhibit

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

4.4

PERFORMANCE OBJECTIVE

P4.4 Given necessary material and guidelines, prepare a natural resources enterprise exhibit for class that could also be used at fairs, sports shows, or schools. The exhibit must meet all criteria listed in C4.4 and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.4.1 Prepare a schedule of appearances for each exhibit for an appropriate time frame.

E4.4.2 Write plans for exhibit transportation, set-up, and maintenance during the show.

E4.4.3 Determine what the personnel needs at the exhibit during the show would be and make up a schedule of appropriate personnel.

E4.4.4 Identify procedure for training personnel to greet the public viewing the exhibit.

E4.4.5 Keep area around the exhibit free of litter.

CRITERION-REFERENCED MEASURE

C4.4 Prepare a natural resources enterprise exhibit for class that could also be used at fairs, sports shows, or schools. The exhibit must be judged acceptable according to instructor-prepared checklist and meet the following criteria:

1. Exhibit set up properly
2. All moving parts functioning properly
3. Area around the exhibit conducive to observation and free of litter
4. Personnel courteous and helpful to the viewing audience.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare and maintain an exhibit concerned with natural resources management. The exhibit could be displayed at local schools, a county fair, or at shopping malls. A rotation system for staffing the exhibit should be developed until all students have had an opportunity to greet the public (E4.4.1-E4.4.5).

2. Have students visit five preselected exhibits at a fair or show and then discuss the procedures used to maintain these exhibits (E4.4.1-E4.4.5).

3. Invite a local exhibitor to bring a natural resources related exhibit to the school and discuss the topic while actually performing the tasks involved (E4.4.1-E4.4.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared exhibit guidelines
Instructor-prepared checklist for exhibits
Assorted fasteners (nails, screws, tape, wire, etc.)
Assorted hand tools (hammer, pliers, saw, wrenches, etc.)

SELECTED AUDIOVISUAL MATERIALS

Slides of natural resources exhibits

SELECTED REFERENCES

Teaching Materials:
Activities for Learning About Conservation of Forest Resources. A Guide for Leaders of Youth Groups, USDA, Forest Service.

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

TASK/COMPETENCY

4.5 Present demonstrations to promote a natural resources enterprise

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

4.5

PERFORMANCE OBJECTIVE

P4.5 Given a prescribed need for promotion for a natural resources enterprise, present demonstrations to the class to promote a natural resources enterprise or concept. Performance of demonstration must include all criteria listed in C4.5 and must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.5.1 Determine the content or concept that is appropriate for a demonstration to a particular audience.

E4.5.2 Develop a written outline for the demonstration that includes the procedures to follow, safety precautions, and notes to the demonstrator.

E4.5.3 Assemble materials needed for the demonstration.

E4.5.4 List the logical or procedurally correct steps to follow for the demonstration.

E4.5.5 Describe how to involve the audience in the demonstration.

E4.5.6 Prepare answers to anticipated questions that an audience may have.

E4.5.7 Determine suitable time limits for a demonstration.

CRITERION-REFERENCED MEASURE

C4.5 Present demonstrations to the class to promote a natural resources enterprise or concept. Performance of demonstration must include all criteria listed below and be judged acceptable according to instructor-prepared checklist.

1. Content or concept is appropriate for a demonstration.
2. Student develops and follows a written outline for the demonstration.
3. A logical or procedurally correct manner is followed in the presentation.
4. Audience is involved in the demonstration (volunteer, questioning, prompting, etc.)
5. Questions are handled satisfactorily.
6. Time limits are established and met.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have each student in the class prepare and present a demonstration on a skill required in the natural resources management area. Demonstrations may be given in class. Students who volunteer could then give their demonstration to school classes or civic organizations (E4.5.1-E4.5.7).

2. Invite a representative from a local natural resources business or agency to class to present a demonstration. Have the demonstrator and the class prepare a critique of the demonstration (E4.5.1-E4.5.7).

3. Have the person mentioned in activity 2 observe and make comments about demonstrations given by the students (E4.5.1-E4.5.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on demonstrations

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Naturalist Notes, USDA, Forest Service.

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

4.6 Demonstrate knowledge of broadcast promotions

COURSE

Postsecondary

4.6

PERFORMANCE OBJECTIVE

P4.6 Given a situation involving a natural resources business or agency to advertise and promote, demonstrate knowledge of broadcast promotions in radio and television programs by writing one promotional plan for radio and one for television. Plan must include time, station, visual and written materials, and appropriate terminology must be used. Plans must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.6.1 Select a radio or television station with the appropriate listening audience.

E4.6.2 Plan needed radio or television program.

E4.6.3 Determine best or available times of broadcast.

E4.6.4 Determine necessary written and visual materials for the broadcast.

E4.6.5 Explain how to use time effectively in preparing and scheduling the broadcast.

E4.6.6 Demonstrate ability to use correct grammar, spelling, and vocabulary.

E4.6.7 Define terminology associated with radio and television.

CRITERION-REFERENCED MEASURE

C4.6 Demonstrate knowledge of broadcast promotions by writing one promotional plan for radio and one for television. Plan must include time, station, visual and written materials, and appropriate terminology must be used. Plans must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine local radio and television broadcasts for examples of programs featuring natural resource businesses or agencies (E4.6.1-E4.6.7).

2. Have students plan the needed radio or television program (E4.6.1-E4.6.7).

3. Have students prepare the radio or television program, using a tape recorder or videotape recorder. Invite a local radio or television announcer to review and comment upon the audio or videotapes (E4.6.1-E4.6.7).

SELECTED TOOLS AND MATERIALS

Tape recorder
Video-tape camera and recorder
Instructor-prepared checklist on broadcast promotions

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

TASK/COMPETENCY

4.7 Assist in conducting tours

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Postsecondary

4.7

PERFORMANCE OBJECTIVE

P4.7 Given a natural resources enterprise to use, assist in conducting tours of the enterprise by serving as a tour guide on a nature trail or other appropriate location. Acceptable performance will be when all criteria in C4.7 have been met and judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.7.1 Describe the function of a tour guide in general terms and for a specific situation.

E4.7.2 Identify the criteria for evaluation listed in C4.7 and the importance of each criterion.

E4.7.3 Explain importance of demonstrating skill in speaking and use of vocabulary.

CRITERION-REFERENCED MEASURE

C4.7 Assist in conducting tours of a natural resources enterprise by serving as a tour guide on a nature trail or other appropriate location. Acceptable performance will be when all criteria below have been met and tours are judged acceptable according to instructor-prepared checklist.

1. Greeted group cheerfully
2. Explained purpose of the tour
3. Noted particular rules or safety precautions to be followed
4. Moved the group at an appropriate pace
5. Handled questions from the group satisfactorily
6. Displayed enthusiasm for job while maintaining control of group
7. Used tact in handling members of the tour group
8. Ended tour in a positive manner.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss desirable characteristics of a tour guide (E4.7.1).
2. Select an appropriate tour site, such as a section of a nature trail. Have each student prepare and present the written comments that he or she feels should be made by the tour guide for a group of elementary schoolchildren and for a group of senior citizens. Revise the content, if necessary, and have students conduct the tours with these audiences (E4.7.1-E4.7.3).
3. Have students conduct tours of the natural resources management program at the school site or at any outdoor facilities used by the class (E4.7.1-E4.7.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist for conducting tours

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

4. ADVERTISING AND PROMOTING A NATURAL RESOURCES ENTERPRISE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

4.8 Address audience interested in natural resources

COURSE

Postsecondary

4.8

PERFORMANCE OBJECTIVE

P4.8 Given a suitable topic that has been approved by the instructor, address an audience interested in natural resources. A 5-minute presentation must be presented and must meet the criteria set forth in C4.8 and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E4.8.1	Select a topic suitable for the time limit.
E4.8.2	Determine the audience that will hear the presentation.
E4.8.3	Identify content to be included in presentation.
E4.8.4	Prepare presentation in outline form (or paragraph form if needed by presenter).
E4.8.5	Demonstrate ability to give presentation to a friend or sample group.
E4.8.6	Present the speech to the appropriate audience.
E4.8.7	Demonstrate ability to use appropriate grammar and vocabulary.

CRITERION-REFERENCED MEASURE

C4.8 Address an audience interested in natural resources. A 5-minute presentation must be presented and meet the criteria that follow:

1. Topic is suitable for oral presentation
2. Level of presentation suits audience
3. Speaker is composed before audience
4. Quality of speaking voice is good
5. Enthusiasm for the topic is exhibited
6. Presentation has overall effectiveness.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students present oral reports to the class in order to develop public speaking confidence (E4.8.5).
2. Have students prepare a 5-minute speech on an appropriate topic in natural resources management (E4.8.1-E4.8.4, E4.8.7).
3. Circulate a list of prepared-speech topics to elementary and junior-high teachers in order for students to gain public speaking experience (E4.8.6).
4. Select the best speeches to be presented to local civic or social groups interested in natural resources (E4.8.6).
5. Have students participate in the FFA extemporaneous and prepared public speaking contests (E4.8.6).

SELECTED TOOLS AND MATERIALS

Instructor-prepared list of speech topics
Tape recorder
Videotape recorder/player
Instructor-prepared checklist for natural resources address

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Secondary public speaking textbook

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASKS/COMPETENCIES

5.1	Interpret laws pertaining to wildlife
5.2	Demonstrate knowledge of various laws pertaining to public facilities operation
5.3	Demonstrate knowledge of compliance with federal and state laws on fishing and boating
5.4	Write a sales contract
5.5	Describe the work of the Environmental Protection Agency
5.6	Demonstrate a knowledge of federal, state, and local laws, rules, and regulations related to environmental protection
5.7	Interpret appropriate federal, state, and local labor laws
5.8	Interpret Occupational Safety and Health Act implications on natural resource enterprises
5.9	Identify laws which regulate public access
5.10	Outline procedure for obtaining a lease with landowner for land open to public activities

CONTENT/CONCEPT
5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

PROGRAM
AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY
5.1 Interpret laws pertaining to wildlife

COURSE
Natural Resources Management V
(8044)

5.1

PERFORMANCE OBJECTIVE

P5.1 Given several hypothetical situations involving the application of legal aspects of natural resources management, interpret laws pertaining to wildlife in each situation by describing the applicable law and the action(s) required by the law. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E5.1.1 Identify reference materials containing wildlife laws and/or their application.

E5.1.2 List important factors to consider for each case situation.

E5.1.3 Explain the law(s) pertaining to each case situation.

E5.1.4 Describe the action(s) to be taken in each case situation.

E5.1.5 Define terminology associated with interpretation of laws.

CRITERION-REFERENCED MEASURE

C5.1 Interpret laws pertaining to wildlife in various situations by describing the applicable law and the action(s) required by the law. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Introduce terminology associated with interpretation of laws and write definitions on the chalkboard (E5.1.5).

2. Develop several case studies involving legal and illegal acts toward wildlife. Have students determine the important facts of each case study and relate the applicable law(s) (E5.1.1-E5.1.3).

3. Have students discuss what actions should be taken by a private citizen and by a game warden in each case study (E5.1.4).

4. Invite a game conservation officer to speak to the class about the application of wildlife laws (P5.1).

SELECTED TOOLS AND MATERIALS

Case studies on wildlife law enforcement
Instructor-prepared worksheet on wildlife laws

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: Resource Law Enforcement, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Migratory Game Bird Regulations, Virginia Commission of Game and Inland Fisheries.
Migratory Waterfowl Regulations, Virginia Commission of Game and Inland Fisheries.
Virginia Game Law Summary, Virginia Commission of Game and Inland Fisheries.
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 94-101, Virginia Commission of Game and Inland Fisheries.

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.2 Demonstrate knowledge of various laws pertaining to public facilities operation

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

5.2

PERFORMANCE OBJECTIVE

P5.2 Given resources on applying legal aspects of natural resources management, demonstrate knowledge of various laws pertaining to the operation of public facilities by developing a handout listing applicable laws. Handout must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E5.2.1 Identify the various laws pertaining to public facilities operation.

E5.2.2 Explain the intent or purpose of each law.

E5.2.3 Determine when a facility operator is or is not in compliance with each public facilities operation law.

E5.2.4 Explain importance of informing (orally or in writing) facility operators of the laws pertaining to public facilities operation.

CRITERION-REFERENCED MEASURE

C5.2 Demonstrate knowledge of various laws pertaining to the operation of public facilities by developing a handout listing applicable laws. Handout must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Develop case studies that relate to the operation of public facilities (P5.2).
2. Assign students to conduct library or telephone research projects to determine laws applying to public facilities operation (E5.2.1).
3. Have students examine each case study for possible violations of law and record the appropriate violation(s) (E5.2.3).
4. Have students prepare posters, bulletin boards, pamphlets, or flyers for each of the laws regulating public facilities operation (E5.2.4).

SELECTED TOOLS AND MATERIALS

Case study about operating public facilities
Instructor-prepared checklist on public facility operations law handout

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.3 Demonstrate knowledge of compliance with federal and state laws on fishing and boating

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

5.3

PERFORMANCE OBJECTIVE

P5.3 Given resources on applying legal aspects of natural resources management, demonstrate knowledge of compliance with federal and state laws on fishing and boating. Acceptable performance will be a minimum score of 75 percent accuracy on an instructor-prepared test.

SELECTED ENABLING OBJECTIVES

E5.3.1 Secure current fishing regulations from the federal and/or state government having authority for a particular body of water.

E5.3.2 Describe fishing license requirements for waters in and bordering Virginia.

E5.3.3 Explain general fishing, game fish, and non-game fish regulations.

E5.3.4 Identify federal and/or state laws regulating boating, including boat registration, titling, and safety equipment requirements.

E5.3.5 Explain federal and state laws on fishing and boating to individuals and groups.

CRITERION-REFERENCED MEASURE

C5.3 Demonstrate knowledge of compliance with federal and state laws on fishing and boating. Acceptable peformance will be a minimum score of 75 percent accuracy on instructor-prepared test.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Identify community sites that issue fishing licenses and regulations (E5.3.1, E5.3.2).

2. Pose case study situations to students regarding fishing and boating regulations and have them secure answers from references or resource persons (E5.3.1-E5.3.5).

3. Invite the local game warden as a guest speaker for the class (E5.3.1-E5.3.5).

4. Have students prepare a program about current fishing and boating regulations that could be presented to local civic and sports groups (E5.3.1-E5.3.5).

SELECTED TOOLS AND MATERIALS

Case studies about fishing and boating regulations
Instructor-prepared test on fishing/boating laws

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Resource Law Enforcement, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Motorboat Owner's Guide, Virginia Commission of Game and Inland Fisheries.
Virginia's (current year) Fishing Regulations, Virginia Commission of Game and Inland Fisheries.

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.4 Write a sales contract

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

5.4

PERFORMANCE OBJECTIVE

P5.4 Given format guidelines and instruction on applying legal aspects of natural resources management, write a sales contract. Acceptable peformance will be a score of 90 percent accuracy on instructor-prepared checklist and inclusion of the five essential elements: competent parties, legal subject matter, an offer, an acceptance, and a consideration.

SELECTED ENABLING OBJECTIVES

E5.4.1 Describe the essential elements of a sales contract (competent parties, legal subject matter, an offer, an acceptance, and a consideration).

E5.4.2 Identify a format for the sales contract.

E5.4.3 Write a list of the essential elements of the sales contract.

E5.4.4 Explain importance of seeking professional assistance and advice in developing, adopting, or signing a sales contract.

E5.4.5 Define terminology associated with a sales contract.

CRITERION-REFERENCED MEASURE

C5.4 Write a sales contract and achieve a score of 90 percent accuracy on instructor-prepared checklist and include the five essential elements: competent parties, legal subject matter, an offer, an acceptance, and a consideration.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students bring examples of written sales contracts to class for examination to determine the essential elements of the sales contract (E5.4.1).

2. Prepare a handout for students that contains a format for a sales contract (E5.4.2).

3. Develop three or four case studies requiring the development of a written sales contract. Assign or have students select the contract they would like to develop. After development, have a lawyer review the contracts for their legality and usefulness (P5.4).

4. Prepare legal sales contracts for appropriate FFA activities, e.g., sales of fruit or livestock (E5.4.1-E5.4.5).

SELECTED TOOLS AND MATERIALS

Case studies requiring written sales contracts
Instructor-prepared handout--sales contract format and legal contract
Instructor-prepared checklist on sales contracts

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.5 Describe the work of the Environmental Protection Agency

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

5.5

PERFORMANCE OBJECTIVE

P5.5 Given reporting guidelines and resources, describe the work of the Environmental Protection Agency (EPA) by writing a report. Report must include the following elements according to instructor-prepared checklist: description of mission or purpose of EPA; organizational chart; programs conducted, administered, or regulated by EPA, with a brief statement of each; and important contributions made by EPA to natural resources management.

SELECTED ENABLING OBJECTIVES

E5.5.1 Identify location of appropriate reference material.

E5.5.2 Determine information to be included in written report.

E5.5.3 Prepare draft of written report.

E5.5.4 Demonstrate ability to use correct grammar, vocabulary, and spelling.

CRITERION-REFERENCED MEASURE

C5.5 Describe the work of the EPA by writing a report which must include the following elements according to instructor-prepared checklist: description of mission or purpose of EPA; organizational chart; programs conducted, administered, or regulated by EPA, with a brief statement of each; and important contributions made by EPA to natural resources management.

Application

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.6 Demonstrate a knowledge of federal, state, and local laws, rules, and regulations related to environmental protection

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

5.6

PERFORMANCE OBJECTIVE

P5.6 Given resources on legal aspects of natural resources management, demonstrate a knowledge of federal, state, and local laws, rules, and regulations related to environmental protection. Acceptable performance will be achieved when the Environmental Protection Legislative Worksheet is completed and judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E5.6.1 Identify major federal and state legislative acts related to environmental protection.

E5.6.2 Describe the intent of each legislative act.

E5.6.3 List punitive actions that may be taken against violators.

E5.6.4 Define terminology associated with laws, rules, and regulations.

CRITERION-REFERENCED MEASURE

C5.6 Demonstrate a knowledge of federal, state, and local laws, rules, and regulations related to enviromental protection. Acceptable performance will be achieved when the Environmental Protection Legislative Worksheet (Test #17) is completed and judged acceptable according to instructor-prepared checklist.

STUDENT'S NAME:______________________ TEST #: 17

COURSE:______________________ P.O. #: 5.6

DATE:______________________ STANDARD: Completion

TEACHER"S NAME:______________________ PERFORMANCE LEVEL:__________

ENVIRONMENTAL PROTECTION LEGISLATIVE WORKSHEET

NAME OF LEGISLATION	YEAR OF ENACTMENT	IMPORTANT PROVISIONS OR IMPACT
1. Clean Air Act Amendments of 1977 PL 95-95		
2. Clean Water Act of 1977 PL 95-217		
3. Resource Conservation and Recovery Act of 1976 PL 94-580		
4. Toxic Substances Control Act of 1976 PL 94-469		

ENVIRONMENTAL PROTECTION LEGISLATIVE WORKSHEET (continued)

NAME OF LEGISLATION	YEAR OF ENACTMENT	IMPORTANT PROVISIONS OR IMPACT
5. Federal Pesticide Act of 1978 PL 95-396		
6.		
7.		
8.		
9.		
10.		

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research to determine the significant pieces of legislation related to environmental protection (E5.6.1).
2. Prepare a copy of Test #17 for each student's usage. Have students fill in the required information for each act (E5.6.1-E5.6.4).
3. Secure a resource person from a local agency involved with enforcement of environmental protection regulations (E5.6.1-E5.6.4).

SELECTED TOOLS AND MATERIALS

Environmental Protection Legislative Worksheet (see attached)
Instructor-prepared checklist on laws/regulations on environmental protection

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
The Principal Laws Relating to Forest Service Activities, USDA, Forest Service.

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.7 Interpret appropriate federal, state, and local labor laws

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

5.7

PERFORMANCE OBJECTIVE

P5.7 Given guidelines and resources on labor laws, interpret the appropriate federal, state, and local labor laws applying to a natural resources business or agency by completion of the Labor Law Checklist for all applicable laws.

SELECTED ENABLING OBJECTIVES

E5.7.1 Identify location for appropriate reference materials describing labor laws.

E5.7.2 Explain applicability of law to a natural resources business or agency.

E5.7.3 Describe the laws pertaining to hiring minors, hazardous occupations, hourly wages, overtime provisions, working conditions, unemployment insurance, worker's compensation, and disability benefits.

E5.7.4 Define terminology associated with labor laws.

CRITERION-REFERENCED MEASURE

C5.7 Interpret the appropriate federal, state, and local labor laws applying to a natural resources business or agency by completion of the Labor Law Checklist (Test #18) for all applicable laws.

STUDENT'S NAME: ____________________ TEST # 18

COURSE: ____________________ P. O. # 5.7

DATE: ____________________ STANDARD: Completion

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: ________

LABOR LAW CHECKLIST

NAME OF ACT	YEAR OF ENACTMENT	IMPORTANT PROVISIONS OR IMPACT
Federal:		
State:		
Local:		

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research or visit a natural resources business or agency to determine the applicable federal, state, and local labor laws (E5.7.1-E5.7.4).

2. Invite a representative from an appropriate local government agency to discuss the topic of labor laws with the class (E5.7.2-E5.7.4).

3. Have students complete the Labor Law Checklist and discuss the implications for employment of minors (E5.7.2-E5.7.4).

SELECTED TOOLS AND MATERIALS

Labor Law Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.8 Interpret Occupational Safety and Health Act implications on natural resources enterprises

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

5.8

PERFORMANCE OBJECTIVE

P5.8 Given a particular local enterprise and the Occupational Safety and Health Act (OSHA), interpret the implications of OSHA on natural resources enterprises by preparing a compliance report to be given to the owner of the facility. The report should include commendations and recommendations and must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E5.8.1 Secure a copy of current OSHA regulations.

E5.8.2 Determine which regulations apply to a natural resources enterprise.

E5.8.3 Identify acceptable and unacceptable situations concerned with OSHA regulations.

E5.8.4 Make a list of recommendations to upgrade unacceptable situations.

E5.8.5 Define terminology associated with OSHA.

CRITERION-REFERENCED MEASURE

C5.8 Interpret the implications of OSHA on a particular natural resources enterprise by preparing a compliance report to be given to the owner of the facility. The report should include commendations and recommendations and must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure a copy of current OSHA regulations and identify those regulations (by underlining) which apply to a natural resources enterprise (E5.8.1, E5.8.2).

2. Visit a natural resources enterprise and determine compliance with OSHA regulations (E5.8.1-E5.8.5).

3. Accompany an OSHA employee on an on-site visit or invite them to class to discuss the topic (E5.8.1-E5.8.5).

SELECTED TOOLS AND MATERIALS

Copy of OSHA regulations
Instructor-prepared checklist on compliance reports

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
All About OSHA, U.S. Department of Labor, Occupational Safety and Health Administration.

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.9 Identify laws which regulate public access

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Postsecondary

5.9

PERFORMANCE OBJECTIVE

P5.9 Given resources regarding application of legal aspects to natural resources management, identify the laws which regulate public access by listing each applicable law and describing its intent or purpose in writing with 90 percent accuracy on instructor-prepared test.

SELECTED ENABLING OBJECTIVES

E5.9.1 Identify location of appropriate reference materials for public access laws.

E5.9.2 Describe the intent of each public access law.

E5.9.3 Define terminology associated with laws regulating public access.

CRITERION-REFERENCED MEASURE

C5.9 Identify the laws which regulate public access by listing each applicable law and describing its intent or purpose in writing with 90 percent accuracy on instructor-prepared test.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research or visit a natural resources business or agency to determine the laws which apply to regulating public access (E5.9.1-E5.9.3).

2. Invite a representative from an appropriate local government agency to discuss the topic of public access with the class (E5.9.1-E5.9.3).

3. Have students prepare a poster illustrating one of the laws pertaining to public access (E5.9.1-E5.9.3).

4. Develop a case study involving public access issues. Have students determine the applicable law and the course of action to be followed in resolving the issue (E5.9.1-E5.9.3).

SELECTED TOOLS AND MATERIALS

Case study regarding public access
Instructor-prepared test on public access regulations

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

5. APPLYING LEGAL ASPECTS OF NATURAL RESOURCES MANAGEMENT

TASK/COMPETENCY

5.10 Outline procedure for obtaining a lease with landowner for land open to public activities

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

5.10

PERFORMANCE OBJECTIVE

P5.10 Given an actual or simulated selection of a site in the local community, outline procedure for obtaining a lease with landowner to open the land to public activities, and draw up the lease. Acceptable peformance will be explaining the lease to a landowner (in the actual situation) or to the instructor in an acceptable manner, according to instructor-prepared guidelines on obtaining leases.

SELECTED ENABLING OBJECTIVES

E5.10.1 Identify reasons why landowners would allow public access to lands.

E5.10.2 Distribute game commission signs and posters for farmers.

E5.10.3 Explain procedure to advise landowners on planting and maintaining game habitats.

E5.10.4 Obtain copies of a lease suitable for usage with landowners.

E5.10.5 Secure leases with individual landowners.

E5.10.6 Define terminology associated with leases.

CRITERION-REFERENCED MEASURE

C5.10 Outline procedure for obtaining a lease with landowner in actual or simulated situation to open the land to public activities, and draw up the lease. Acceptable performance will be explaining the lease to a landowner (in the actual situation) or to the instructor in an acceptable manner, according to instructor-prepared guidelines on obtaining leases.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select a site in the local community that has land open to public activities. Contact the landowner or a representative and invite the person to speak to the class regarding this topic (E5.10.1-E5.10.6).
2. Contact local landowners and determine their interest in having land open to public activities (E5.10.1-E5.10.6).
3. Have students designate in color the following categories on a local map: posted, open, not designated (E5.10.1-E5.10.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared guidelines on obtaining leases

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
An Assessment of the Forest and Range Land Situation in the United States, USDA, Forest Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASKS/COMPETENCIES

6.1 Demonstrate knowledge of the environment, its pollution problems, and possible solutions

6.2 Describe the sources of water for home and industrial uses

6.3 List the various ways consumers use water

6.4 Describe how agriculture and the ecosystem are interrelated

6.5 Describe how agriculture and the environment are interrelated

6.6 Identify air pollutants and describe their effects on the environment

6.7 Select the best method to control air pollution

6.8 Identify common vegetation materials used for resource conservation

6.9 Identify practices to control soil erosion

6.10 Identify and explain the various methods of water treatment

6.11 Identify water pollutants and describe their effect on the environment

6.12 Select the best method to control water polution

6.13 Make recommendations on good sanitation practices and principles

6.14 Describe federal and state agencies responsible for protecting the environment

6.15 Describe methods of dealing with conservation problems, planning, and practices

6.16 Interpret the various programs of the soil conservation agencies

6.17 Analyze a sample of water

6.18 Estimate the water needs for a farm or natural resource enterprise

6.19 Collect necessary samples for EPA inspections

6.20 Participate in investigative activities by collecting field data for agencies

6.21 Operate and maintain the Dissolved Oxygen Meter and Sampler

6.22 Monitor potential pollutors

6.23 Demonstrate ability to advise public on pollution problems

6.24 Diagram a sewage disposal system

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASK/COMPETENCY

6.1 Demonstrate knowledge of the environment, its pollution problems, and possible solutions

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management III (8040)

6.1

PERFORMANCE OBJECTIVE

P6.1 Given the format for a written report, demonstrate knowledge of the environment, its pollution problems, and possible solutions to the pollution problems by writing a three- to five-page report. Successful performance will be an acceptable rating on the written report according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.1.1 Define environment and ecosystem.

E6.1.2 Explain the importance of photosynthesis and respiration.

E6.1.3 Identify biogeochemical cycles such as water, carbon, nitrogen, phosphorous, calcium, and sulfur.

E6.1.4 Describe pollution caused by nature (volcanoes, earthquakes, dust storms, and salt spray from ocean storms) and by people (presence of large quantities of phosphorus, nitrogen, sulfur dioxide, heavy metals, hydrocarbons, radioactive materials, solid waste, sewage, excess heat, and noise).

E6.1.5 List possible solutions to pollution problems.

E6.1.6 Explain conservation techniques, including recycling.

E6.1.7 Name alternate sources of energy that are less prone to pollution.

E6.1.8 Explain the need for land-use planning.

CRITERION-REFERENCED MEASURE

C6.1 Demonstrate knowledge of the environment, its pollution problems, and possible solutions by writing a three- to five-page report. Successful performance will be an acceptable rating on report according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Define and discuss terminology associated with environmental concerns (E6.1.1-E6.1.7).
2. Take a field trip around the local community to discover pollution problems (E6.1.4).
3. Examine polluted and non-polluted sites in the local community on a field trip to discover possible solutions for polluted sites (E6.1.5).
4. Invite a person knowledgeable in environmental protection to speak to the class (E6.1.1-E6.1.8).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on environmental pollution

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Ecology and the Agricultural Environment (2) Water and the Agricultural Environment (3) Soil and the Agricultural Environment (4) Air and the Agricultural Environment (5) People and the Agricultural Environment. Ecology and Agriculture Kit, Vocational Education Productions.

SELECTED REFERENCES

Books:
Conservation Farming, pp. 2-12, Deere & Company.

Teaching Materials:
Alternative Goals: 1985 Resources Planning Act Program, USDA, Forest Service.
Understanding the Game of the Environment, USDA, Forest Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.2 Describe the sources of water for home and industrial uses

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

6.2

PERFORMANCE OBJECTIVE

P6.2 Given resources and an instructor-prepared worksheet, describe the sources of water for home and industrial uses, including the name of each water source, definition or explanation, estimation of local availability, and projection of long-term availability. Acceptable performance will be a score of 90 percent accuracy on worksheet.

SELECTED ENABLING OBJECTIVES

E6.2.1 Identify ground water sources (wells, springs, and seeps).

E6.2.2 Identify surface water sources (ponds, lakes, streams, irrigation ditches, and cisterns).

E6.2.3 Explain or define each of the ground and surface water sources.

E6.2.4 Explain the availability of each water source and relate to the local community.

E6.2.5 Identify future trends for the availability of each water source on a national and local basis.

E6.2.6 Determine feasibility of developing additional water sources.

CRITERION-REFERENCED MEASURE

C6.2 Describe the sources of water for home and industrial use with 90 percent accuracy on instructor-prepared worksheet. Descriptions must include the name of each water source, definition or explanation, estimation of local availability, and projection of long-term availability. Acceptable performance will be a score of 90 percent accuracy on worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students select a specified geographical area, e.g., the state, county, or local town, and identify the sources of water within the geographic region (E6.2.1-E6.2.2).

2. Conduct library research or interview older residents of the community to determine trends associated with the water supply (E6.2.3-E6.2.5).

3. Invite a local science teacher to discuss the topic of sources of water with the class, especially as it relates to the development of new water sources (E6.2.1-E6.2.6).

SELECTED TOOLS AND MATERIALS

Maps of a geographic region
Instructor-prepared worksheet on water sources

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Conservation Farming, pp. 44-49, Deere & Company.
Outdoors, USA, The Yearbook of Agriculture, USDA.

Teaching Materials:
Water Supply Sources for the Farmstead and Rural Home, USDA, Science and Education Administration.
Maps of a geographic region

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.3 List the various ways consumers use water

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

6.3

PERFORMANCE OBJECTIVE

P6.3 Given resources on water as a natural resource and the categories of consumers, including individuals, businesses or industries, farmers, and wildlife, list at least five usages of water for at least three categories of consumers on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E6.3.1 List the ways that water is used by individuals, businesses, farmers, and wildlife.

E6.3.2 Compare the four usage lists to determine commonalities and differences.

E6.3.3 Explain the distinction between consumptive and non-consumptive uses of water.

CRITERION-REFERENCED MEASURE

C6.3 List at least five usages of water for at least three categories of consumers on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a contest to have students list as many different ways as they can that water is used by either individuals, businesses or industries, farmers, or wildlife. Each student should develop a list for one or more categories (E6.3.1).

2. Recognize all persons listing a minimum number of uses of water as well as the person wtih the most listings (E6.3.1).

3. Have students compare their usage lists within and between categories of consumers (E6.3.2).

4. Have students keep a log of weekly activities and note their usage of water during the week. Determine ways that consumption could be reduced (E6.3.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared worksheet on water consumption

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

6.4 Describe how agriculture and the ecosystem are interrelated

COURSE

Natural Resources Management IV
(8042)

6.4

PERFORMANCE OBJECTIVE

P6.4 Given instruction on environmental protection, describe how agriculture and the ecosystem are interrelated in a three- to five-page report. The description must include at least five factors that illustrate this interrelationship and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.4.1 Define terminology associated with agriculture and the ecosystem.

E6.4.2 Identify the benefits and losses that have occurred because of modern agricultural practices.

E6.4.3 Explain the relationship between modern agricultural practices and the presence of native wildlife and plant populations.

E6.4.4 Describe the effects of modern agricultural practices upon the water supply of an ecosystem.

CRITERION-REFERENCED MEASURE

C6.4 Describe how agriculture and the ecosystem are interrelated in a three- to five-page report by describing five factors to illustrate this interrelationship. Report must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Locate reference materials discussing the topic of the interrelationship of agriculture and the ecosystem (E6.4.1).
2. Prepare a handout describing the benefits and losses attributed to modern agricultural practices (E6.4.2).
3. Have students interview older residents of the community to determine changes brought about by agriculture (E6.4.2-E6.4.4).
4. Conduct a field trip to a nearby farm and have students determine the impact of agricultural practices upon the ecosystem (E6.4.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on agricultural practices
Instructor-prepared checklist on agriculture/ecosystem interrelationship

SELECTED AUDIOVISUAL MATERIALS

Slidefilm: Agriculture and the Ecosystem, Vocational Agriculture Service.

SELECTED REFERENCES

Teaching Materials:
Description of the Ecoregions of the United States, USDA, Forest Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

6.5 Describe how agriculture and the environment are interrelated

COURSE

Natural Resources Management IV
(8042)

6.5

PERFORMANCE OBJECTIVE

P6.5 Given resources on environmental protection, describe how agriculture and the environment are interrelated in a five-minute oral report to the class. The report must include at least five factors that illustrate this interrelationship and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.5.1 Define terminology associated with agriculture and the environment.

E6.5.2 Identify the benefits and losses that have occurred on this planet because of agriculture.

E6.5.3 Describe the effect of agriculture on the environment.

E6.5.4 Determine the long-range effects of inorganic fertilizers, pesticides. manure, and crop residues upon our environment.

CRITERION-REFERENCED MEASURE

C6.5 Describe how agriculture and the environment are interrelated in a five-minute oral report to the class. Report must include at least five factors that illustrate this interrelationship and be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Locate reference materials discussing the topic of the interrelationship of agriculture and the environment (E6.5.1).

2. Prepare a handout describing the benefits and losses attributed to the effects of agriculture upon the environment (E6.5.2).

3. Have students research the effects of agriculture upon a particular country of the world and its impact upon that country's environment (E6.5.2-E6.5.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on agriculture's effect on the environment
Instructor-prepared checklist on agriculture/environment interrelatedness

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Ecology and the Agricultural Environment (2) Soil and the Agricultural Environment (3) Water and the Agricultural Enviroment (4) Air and the Agricultural Environment (5) People and the Agricultural Environment; Ecology and Agriculture Kit, Vocational Education Productions.

Slidefilms: Agriculture and the Environment, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Conservation Farming, pp. 122-126, Deere & Company.

Teaching Materials:
Agriculture and the Environment, USDA, Office of Environmental Quality.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.6 Identify air pollutants and describe their effects on the environment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

6.6

PERFORMANCE OBJECTIVE

P6.6 Given a worksheet on air pollution, identify at least four air pollutants and describe their effects on the environment with 100 percent accuracy. Descriptions must include the name of the air pollutant, the major source, the effect of environmental exposure, and the effect of human exposure.

SELECTED ENABLING OBJECTIVES

E6.6.1 Identify the various characteristics of unpolluted air.

E6.6.2 Prepare a list of air pollutants and their identifying properties.

E6.6.3 Identify the locations of local sources of air pollutants.

E6.6.4 Identify air pollutants that occur most commonly in natural resources management.

E6.6.5 Research the effects of an air pollutant on the environment, including plant and animal life.

E6.6.6 Define terminology associated with air pollution.

CRITERION-REFERENCED MEASURE

C6.6 Given a worksheet on air pollution, identify at least four air pollutants and describe with 100 percent accuracy their effects on the environment. Descriptions must include the name of the air pollutant, the major source, the effect of environmental exposure, and the effect of human exposure.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct a survey of the local community, or a portion thereof, to locate sources of air pollutants (E6.6.1).
2. Arrange a field trip to a local site to examine the effects of an air pollutant or to observe pollution control devices (E6.6.5).
3. Assign students to conduct library research to determine the effects of air pollutants (E6.6.2, E6.6.6).
4. Have students select and maintain two air sampling sites that have physically different air qualities (E6.6.3-E6.6.5).
5. Have students attempt to germinate and grow seedlings, using air containing different pollutants, and record the effects upon the seedlings (E6.6.5).

SELECTED TOOLS AND MATERIALS

Growing medium
Samples of polluted air (or means of polluting air samples)
Seeds

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Air and the Agricultural Environment, Ecology and Agriculture Kit, Vocational Education Productions.
Slidefilms: Air Pollution Damage to Vegetation, Vocational Agriculture Service.

SELECTED REFERENCES

Teaching Materials:
The Air Pollution Inspector, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.7 Select the best method to control air pollution

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

6.7

PERFORMANCE OBJECTIVE

P6.7 Given an example of a particular problem and an instructor-prepared worksheet, select the best method to control the air pollution. The instructor must concur that the proposed method(s) is scientifically sound as well as technologically and economically feasible.

SELECTED ENABLING OBJECTIVES

E6.7.1 List reasons for controlling air pollution.

E6.7.2 Take a sample of air to discover pollutants.

E6.7.3 Describe several control methods used for air pollution, including natural means.

E6.7.4 Identify the laws and regulations to control air pollution.

E6.7.5 Define terminology associated with controlling air pollution.

CRITERION-REFERENCED MEASURE

C6.7 Select the best method to control the air pollution in a particular problem. The instructor must concur that the method(s) is scientifically sound as well as technically and economically feasible.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research to determine methods used in controlling air pollution (E6.7.2).
2. Have students visit local sites to observe air pollution control methods in usage (E6.7.1-E6.7.3).
3. Assign students to collect samples of air in the laboratory before and after class usage. Have them formulate and incorporate ways to control the pollution present (E6.7.1-E6.7.3).
4. Discuss the laws and regulations relating to air pollution in regard to specific instances of pollution (E6.7.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared worksheet on air pollution

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
The Air Pollution Inspector, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

6.8 Identify common vegetation materials used for resource conservation

COURSE

Natural Resources Management IV
(8042)

6.8

PERFORMANCE OBJECTIVE

P6.8 Given instruction on protecting the environment and an instructor-prepared test, identify common vegetation materials used for resource conservation. At least fifteen plants must be identified with 100 percent accuracy, and the plants identified must include the names of the five plants most commonly found locally.

SELECTED ENABLING OBJECTIVES

E6.8.1 Identify location of a source listing the plants commonly used for resource conservation.

E6.8.2 Describe the characteristics of the vegetative materials used for resource conservation.

E6.8.3 Identify commonly used vegetation materials by supplying the correct common name when shown the material.

E6.8.4 Identify application situations for each of the common vegetation materials.

E6.8.5 Define terminology associated with conservation.

CRITERION-REFERENCED MEASURE

C6.8 Identify common vegetation materials used for resource conservation on instructor-prepared test. At least fifteen plants must be identified with 100 percent accuracy, and the plants identified must include the names of the five plants most commonly found locally.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Examine several local sites where vegetation has been used for resource conservation. Have students identify the plant materials used and discuss their suitability to the site (E6.8.1-E6.8.4).
2. Have students secure pictures (slides, photos, drawings, etc.) of each of the common vegetation materials (E6.8.1-E6.8.3).
3. Assign students to collect samples of the common vegetation materials (E6.8.3).
4. Select three sites requiring vegetation materials for resource conservation. Have each student develop a written plan for the placement of vegetation materials on the site (E6.8.1-E6.8.5).

SELECTED TOOLS AND MATERIALS

Mounts for plant samples
Instructor-prepared test on vegetation materials

SELECTED AUDIOVISUAL MATERIALS

Slidefilms: Vegetation Control as an Aid to Environmental Quality, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Conservation Farming, pp. 29-31, 80-83, Deere & Company.

Teaching Materials:
Plant Materials for Conservations, USDA, Soil Conservation Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.9 Identify practices to control soil erosion

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

6.9

PERFORMANCE OBJECTIVE

P6.9 Given the opportunity to examine a particular site affected by erosion, identify practices that could be employed to control the soil erosion found on the site. Practices must be consistent with Soil Conservation Service recommendations and approved by the instructor.

SELECTED ENABLING OBJECTIVES

E6.9.1 Define or describe soil erosion.

E6.9.2 Describe the major factors causing soil erosion.

E6.9.3 List the consequences of uncontrolled soil erosion.

E6.9.4 Describe or identify factors affecting rates of soil erosion.

E6.9.5 Identify control practices that could be implemented for eroded sites.

E6.9.6 Define terminology associated with soil erosion and control practices.

E6.9.7 Apply mathematical skills associated with soil erosion and control practices.

CRITERION-REFERENCED MEASURE

C6.9 Identify practices that could be employed to control the soil erosion found on a particular site. Practices must be consistent with Soil Conservation Service recommendations and approved by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine the local community to determine the degree of soil erosion, factors causing erosion, and the control measures being implemented. Have students discuss specific examples in class (E6.9.1-E6.9.5).

2. Have students conduct library research to compile a list of soil erosion control techniques (E6.9.5).

3. Select a local farm or forest and have students develop a soil erosion prevention plan for the site (E6.9.1-E6.9.7).

SELECTED TOOLS AND MATERIALS

Soil Conservation Service recommendations

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Soil and the Agricultural Environment, Ecology and Agriculture Kit, Vocational Education Productions.
Slidefilms: Erosion, Sedimentation, and Environmental Quality, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Conservation Farming, pp. 70-89, Deere & Company.

Teaching Materials:
Determining Probable Soil Losses in Conservation Planning, Vocational Agricultural Services.
National Forest Landscape Management: Range, USDA, Forest Service.
Using Conservation Tillage Systems, Vocational Agricultural Services.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.10 Identify and explain the various methods of water treatment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

6.10

PERFORMANCE OBJECTIVE

P6.10 Given an instructor-prepared worksheet outlining the need for water suitable for human, livestock, and industrial consumption uses, identify and explain the various methods of water treatment for each situation with 90 percent accuracy according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

6.10.1 Identify and explain chlorination of water.

6.10.2 Define pasteurization, ultraviolet light, and ozone disinfection of water.

6.10.3 Describe the effects of storage on water.

6.10.4 Relate the types of water storage systems to methods of water treatment.

CRITERION-REFERENCED MEASURE

C6.10 Identify and explain the various methods of water treatment for the following situations, achieving 90 percent accuracy:

a. water that must be treated for human consumption
b. water that must be fit for livestock consumption
c. water that must be usable by a small manufacturing plant for its industrial usages.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a field trip to a local water treatment plant to observe the methods of water treatment employed (E6.10.1, E6.10.2).

2. Have students conduct various experiments regarding water treatment and its effect upon the bacteria and other organisms present in the treated water (E6.10.1, E6.10.2).

3. Invite a representative from a local health agency to discuss the topic of water treatment with the class (E6.10.1-E6.10.4).

SELECTED TOOLS AND MATERIALS

Microscope
Instructor-prepared worksheet on water treatment
Instructor-prepared checklist on water treatment methods

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Planning for an Individual Water System, American Association for Vocational Instructional Materials.
Treating Farmstead and Rural Home Water Systems, USDA, Agricultural Research Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.11 Identify water pollutants and describe their effect on the environment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

6.11

PERFORMANCE OBJECTIVE

P6.11 Given instructor-prepared worksheet on water pollution, identify water pollutants and describe their effects on the environment. At least five sources should be described correctly, and contain the following factors: the name of the water pollutant, major source(s) of the pollutant, the effect upon environmental exposure, and the effect upon human exposure.

SELECTED ENABLING OBJECTIVES

E6.11.1 Identify and locate local sources of water pollutants.

E6.11.2 Research the effects of a water pollutant on the environment.

E6.11.3 Define terminology associated with water pollution.

CRITERION-REFERENCED MEASURE

C6.11 Identify at least five sources of water pollutants and correctly describe their effects on the environment. Use the following factors in the description:

1. Name of water pollutant
2. Major source or sources of the water pollutant
3. Effect upon environmental exposure
4. Effect upon human exposure.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct a survey of the local community, or a portion thereof, to locate sources of water pollution (E6.11.1).
2. Have students visit a local site to examine the effects of a water pollutant (E6.11.2).
3. Assign students to conduct library research to determine the effects of water pollutants (E6.11.2, E6.11.3).
4. Have students attempt to germinate and grow seedlings, using water with different pollutants, and record the effects upon the seedlings (E6.11.2).

SELECTED TOOLS AND MATERIALS

Growing medium
Samples of polluted water
Seeds
Instructor-prepared worksheet on water pollution

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Water and the Agricultural Environment, Ecology and Agriculture Kit, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Treating Farmstead and Rural Home Water Systems, USDA, Agricultural Research Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

6.12 Select the best method to control water pollution

COURSE

Natural Resources Management IV
(8042)

6.12

PERFORMANCE OBJECTIVE

P6.12 Given an example of a particular problem and an instructor-prepared worksheet, select the best method to control the water pollution. The instructor must concur that the proposed method is scientifically sound, as well as technologically and economically feasible.

SELECTED ENABLING OBJECTIVES

E6.12.1 List reasons for controlling water pollution.

E6.12.2 Collect and analyze a sample of water from several sources.

E6.12.3 Explain several control methods used for water pollution.

E6.12.4 Describe the laws and regulations enacted to control water pollution.

E6.12.5 Define terminology associated with controlling water pollution.

CRITERION-REFERENCED MEASURE

C6.12 Select the best method to control the water pollution in a particular problem. The instructor must concur that the method(s) are acceptable as being scientifcally sound, as well as technologically and economically feasible.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research to determine methods used in controlling water pollution (E6.12.3, E6.12.5).

2. Conduct a field trip to visit local sites to observe water pollution control methods in usage (E6.12.1-E6.12.3).

3. Have students collect samples of water from several sources. Analyze each sample of water to determine organisms present. Formulate ways to control the pollution present in the water (E6.12.1-E6.12.3).

4. Discuss the laws and regulations relating to water pollution in regard to specific instances of pollution (E6.12.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared worksheet on control of water pollution

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASK/COMPETENCY

6.13 Make recommendations on good sanitation practices and principles

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

6.13

PERFORMANCE OBJECTIVE

P6.13 Given resources on environmental protection, make recommendations on good sanitation practices and principles in a two- to three-page written report. Recommendations made must be judged acceptable according to instructor-prepared checklist and must conform to public health standards.

SELECTED ENABLING OBJECTIVES

E6.13.1 Define terminology associated with sanitation.

E6.13.2 Identify location of appropriate reference materials describing sanitation practices and principles.

E6.13.3 Identify situations where sanitation practices and principles are applicable.

E6.13.4 Determine most effective and efficient practice for a given situation.

E6.13.5 List recommendations orally or in writing for a given situation.

CRITERION-REFERENCED MEASURE

C6.13 Make recommendations on good sanitation practices and principles in a two- or three-page written report. Recommendations made must be judged acceptable according to instructor-prepared checklist and must conform to public health standards.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Develop case study situation requiring the student to develop recommendations on good sanitation practices and principles. Suggested case study topics include the handling of food, water, or human wastes on developed or primitive campsites (E6.13.1-E6.13.5).
2. Invite a representative from a local health agency to speak to the class about good sanitation practices and principles (E6.13.5).
3. Visit a local campsite and determine the principles and practices of good sanitation when handling wastes that are being used (E6.13.3).

SELECTED TOOLS AND MATERIALS

Case studies about sanitation practices and principles
Instructor-prepared checklist on sanitation

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASK/COMPETENCY

6.14 Describe federal and state agencies responsible for protecting the environment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

6.14

PERFORMANCE OBJECTIVE

P6.14 Given resources on environmental protection, describe federal and state agencies responsible for protecting the environment. A written report should be prepared for the Environmental Protection Agency, the Virginia Soil and Water Conservation Commission, and the Soil Conservation Service (federal level). The descriptions should include the agency organization and the purpose of each unit within the agency, and must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.14.1 Identify location of appropriate reference material.

E6.14.2 Determine information to be included in written report.

E6.14.3 Prepare draft of written report.

E6.14.4 Demonstrate ability to use correct grammar, vocabulary, and spelling.

CRITERION-REFERENCED MEASURE

C6.14 Describe federal and state agencies responsible for protecting the environment by preparing a written report on each of the following agencies: Environmental Protection Agency, Virginia Soil and Water Conservation Commission, and Soil Conservation Service (federal level). The descriptions should include the agency organization and the purpose of each unit within the agency, and must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research to determine the federal and state agencies responsible for protecting the environment. Groups of students could research one agency listed in C6.14 and develop a group report of findings to share (E6.14.1-E6.14.4).
2. Invite a representative from one of the federal or state agencies to speak to the class regarding the work of the agency in environmental protection (P6.14).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on protection agencies

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Services Available Through the U.S. Department of Agriculture, USDA, Office of the Secretary.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

6.15 Describe methods of dealing with conservation problems, planning, and practices

COURSE

Postsecondary

6.15

PERFORMANCE OBJECTIVE

P6.15 Given the opportunity to visit two field sites, describe methods of dealing with conservation problems, planning, and practices. Acceptable performance will be achieved when descriptions are 100 percent accurate and contain the following information for each site: existing or potential conservation problems and a plan for dealing with them, conservation practices employed, and costs for leaving or correcting the problems.

SELECTED ENABLING OBJECTIVES

E6.15.1 Identify existing or potential conservation problem(s).

E6.15.2 Describe the problem orally to the instructor.

E6.15.3 Determine one or more plans that could be used to correct the problem.

E6.15.4 Explain the conservation practices that would be used to correct or lessen the problem.

E6.15.5 Estimate the costs associated with leaving or correcting the problem.

E6.15.6 Define terminology associated with conservation.

CRITERION-REFERENCED MEASURE

P6.15 Describe methods of dealing with conservation problems, planning, and practices by describing with 100 percent accuracy the following information for each site: existing or potential conservation problems and a plan for dealing with them, conservation practices employed, and costs for leaving or correcting the problems.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students identify existing and potential conservation problem sites in the local community (E6.15.1).

2. Have students compile a list of conservation practices employed in the local community (E6.15.4).

3. Invite a local soil conservationist to conduct the class at the field trip site in order for students to hear from a professional that deals with the problem daily (E6.15.1-E6.15.6).

4. Take students to two selected sites in the local community that have existing or potential conservation problems. Have students individually give an oral report that contains the information listed in C6.15 (E6.15.1-E6.15.6).

SELECTED TOOLS AND MATERIALS

None

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: People and the Agricultural Environment, Ecology and Agriculture Kit, Vocational Education Productions.

SELECTED REFERENCES

Books:
Conservation Farming, Deere & Company.

Teaching Materials:
A Computerized System for Estimating and Displaying Shortrun Costs of Soil Conservation Practices, USDA, Economic Research Service.
Using Conservation Tillage Systems, Vocational Agricultural Service.

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

6.16 Interpret the various programs
of the soil conservation agencies

COURSE

Natural Resources Management V
(8044)

6.16

PERFORMANCE OBJECTIVE

P6.16 Given resources on protecting the soil component of the environment, interpret the various programs of the following soil conservation agencies by describing their major programs: Agricultural Stabilization and Conservation Service; Bureau of Land Management; National Association of Conservation Districts; Soil Conservation Service; Soil Conservation Society of America; and Virginia Soil and Water Conservation Districts. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared test.

SELECTED ENABLING OBJECTIVES

E6.16.1 Explain the mission or purpose of each agency.

E6.16.2 Determine the funding source of each agency.

E6.16.3 Identify the major programs conducted by soil conservation agencies.

E6.16.4 Relate the programs offered by a conservation agency to a farm or natural resources business.

CRITERION-REFERENCED MEASURE

C6.16 Interpret the various programs of the following agencies by describing their major programs: Agricultural Stabilization and Conservation Service; Bureau of Land Management; National Association of Conservation Districts; Soil Conservation Service; Soil Conservation Society of America; and Virginia Soil and Water Conservation Districts.Acceptable performance will be a score of 90 percent accuracy on instructor-prepared test.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students conduct library research to determine the various programs of the soil conservation agencies (E6.16.1-E6.16.4).
2. Invite a representative from a soil conservation agency to discuss the programs offered by various agencies (E6.16.1-E6.16.4).
3. Prepare a bulletin board depicting the work of soil conservation agencies (E6.16.1-E6.16.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared test on soil conservation agencies

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

6.17 Analyze a sample of water

COURSE

Natural Resources Management V
(8044)

6.17

PERFORMANCE OBJECTIVE

P6.17 Given samples of water and testing equipment, analyze a sample of water by determining bacteria count, pH, hardness, chlorination, and nitrate content. All test results must be completed by following directions and must be judged acceptable according to instructor-prepared checklist, and results must be recorded on an instructor-prepared form.

SELECTED ENABLING OBJECTIVES

E6.17.1 Collect samples of water from different sources.

E6.17.2 Outline procedures to be followed in analyzing water samples.

E6.17.3 List bacteria count for water sample.

E6.17.4 Determine pH, hardness, chlorination, and nitrate content of water sample.

E6.17.5 Record information for each water sample.

CRITERION-REFERENCED MEASURE

C6.17 Analyze a sample of water by determining bacteria count, pH, hardness, chlorination, and nitrate content. All test results must be completed by following directions and must be judged acceptable according to instructor-prepared checklist, and results must be recorded on an instructor-prepared form.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students take samples of water for testing from different sources of water (town, river, lagoon) (E6.17.1).

2. Have students perform tests for pH, hardness, chlorination, and nitrate content on each sample and record results (E6.17.2-E6.17.5).

3. Have students guess the source of each sample based upon the total test results and compare their guess with the actual source (E6.17.1-E6.17.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared water quality recording form
Instructor-prepared checklist on water tests
Water quality testing equipment
Water samples

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASK/COMPETENCY

6.18 Estimate the water needs for a farm or natural resource enterprise

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

6.18

PERFORMANCE OBJECTIVE

P6.18 Given data concerning the uses of a farm or a natural resource enterprise, estimate the water needs for the farm or natural resource enterprise. Acceptable performance will be achieved when the student's answer is within ±10 percent of the instructor's estimate.

SELECTED ENABLING OBJECTIVES

E6.18.1 Identify the various uses for water on the farm or natural resource enterprise site.

E6.18.2 Determine human consumption needs for water, including household needs.

E6.18.3 Determine livestock consumption needs for water.

E6.18.4 Determine lawn, garden, and crop consumption needs for water.

E6.18.5 Identify needs for a natural resource enterprise.

E6.18.6 Compute the total gallons of water needed for a given time period.

E6.18.7 Apply mathematical skills associated with estimation of water needs.

CRITERION-REFERENCED MEASURE

C6.18 Estimate the water needs for a farm or a natural resource enterprise. The student's answer should be within ±10 percent of the answer calculated by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students suggest the various uses for water on a farm or natural resources enterprise site (E6.18.1).
2. Supply or have students develop the daily water consumption and usage rates for each specific usage (E6.18.2-E6.18.5).
3. Devise a form for estimating the total water needs for a farm or natural resources enterprise (E6.18.1-E6.18.7).
4. Have students compute the estimated water needs for one year for a given situation (E6.18.1-E6.18.7).

SELECTED TOOLS AND MATERIALS

Calculator
Instructor-prepared form for estimating water needs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Conservation Farming, pp. 46-67, 134, Deere & Company.

Teaching Materials:
Water Supply Sources for the Farmstead and Rural Home, p. 2, USDA, Science and Education Administration.

Application

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.19 Collect necessary samples for
EPA inspections

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

6.19

PERFORMANCE OBJECTIVE

P6.19 Given access to EPA guidelines and sample forms on environmental protection, collect necessary samples for EPA inspections. Air and water samples must be taken according to guidelines in EPA specifications, and accompanying written documents must meet with an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.19.1 Locate references related to collection of air and water samples.

E6.19.2 Identify equipment needed for sample collection.

E6.19.3 Outline procedures to be followed during sample collection.

E6.19.4 Prepare written documents needed to identify samples.

CRITERION-REFERENCED MEASURE

C6.19 Collect necessary samples for EPA inspections. Air and water samples must be taken according to guidelines in EPA specifications, and accompanying written documents must meet with an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students write the Environmental Protection Agency to secure necessary reference material (E6.19.1).

2. Have students prepare a list of equipment needed for sample collection and determine its availability (E6.19.2).

3. Have students list the procedures to follow for each type of sample to be collected (E6.19.3).

4. Prepare a handout or form that will be used to identify each sample. Have students use forms for each sample collected (E6.19.4).

SELECTED TOOLS AND MATERIALS

Air and water sample collection equipment
Instructor prepared sample identification form
EPA guidelines
Instructor-prepared checklist for written documents

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.20 Participate in investigative
activities by collecting field
data for agencies

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

6.20

PERFORMANCE OBJECTIVE

P6.20 Given guidelines from various agencies on environmental protection and appropriate forms, participate in investigative activities by collecting field data for agencies, such as the Public Health Department or the EPA. All data must be collected following procedures outlined by the respective agency.

SELECTED ENABLING OBJECTIVES

E6.20.1 Determine agency policies for collection of field data.

E6.20.2 Explain legal requirements to be followed during collection of field data.

E6.20.3 Identify the specific data to be collected, along with an appropriate recording form.

E6.20.4 Describe potentially hazardous situations involving endangerments from human or hazardous waste sources.

CRITERION-REFERENCED MEASURE

C6.20 Participate in investigative activities by collecting field data for agencies such as the EPA or Public Health Department. All data must be collected following procedures outlined by the respective agency.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Invite a guest speaker from a local agency to address the class on investigative activities of that agency (E6.20.1).

2. Invite a local lawyer or law enforcement official to speak to the class about legal procedures during investigations (E6.20.2).

3. Simulate an agency investigation with the cooperation of a local business. Have students determine exact data needs and a procedure for data collection that meets agency standards (E6.20.1-E6.20.3).

4. Have students role play situations that include the concept of personal endangerment (E6.20.4).

SELECTED TOOLS AND MATERIALS

Equipment (as required for a specific situation)
Instructor-prepared field data collection form
Agency guidelines

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASK/COMPETENCY

6.21 Operate and maintain the Dissolved Oxygen Meter and Sampler

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

6.21

PERFORMANCE OBJECTIVE

P6.21 Given access to the necessary equipment, demonstrate ability to operate and maintain the Dissolved Oxygen Meter and Sampler. All procedures must conform to those outlined in the owner's manual for the equipment.

SELECTED ENABLING OBJECTIVES

E6.21.1 Secure owner's manual for equipment.

E6.21.2 Outline operating procedures to be followed.

E6.21.3 Explain maintenance procedures to be followed.

E6.21.4 Identify malfunctions in equipment or other situations requiring adjustments.

E6.21.5 Define terminology associated with operation and maintenance of the Dissolved Oxygen Meter and Sampler.

CRITERION-REFERENCED MEASURE

C6.21 Operate and maintain the Dissolved Oxygen Meter and Sampler, conforming to those procedures outlined in the owner's manual.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students review operator's manual, especially noting safety precautions or critical operating instructions (E6.21.1-E6.21.3).
2. Demonstrate operation and maintenance of the equipment for students (E6.21.2, E6.21.3).
3. Conduct an equipment trouble-shooting contest by rigging the equipment with common malfunctions or misadjustments and have students correct problems (E6.21.4, E6.21.5).

SELECTED TOOLS AND MATERIALS

Dissolved Oxygen Meter and Sampler
Water samples

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.22 Monitor potential pollutors

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

6.22

PERFORMANCE OBJECTIVE

P6.22 Given the guidelines for a written report and resources on environmental protection, describe methods that may be used to monitor potential pollutors in a three- to five-page written report. Actions described must be consistent with agency policies regarding monitoring, and report must receive an acceptable rating according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.22.1 Describe agency's policies about monitoring activities.

E6.22.2 Explain harassment as applied to situations involving monitoring.

E6.22.3 Plan a schedule that provides for systematic observation of potential pollutors.

E6.22.4 Maintain accurate records of observations and findings.

E6.22.5 Explain monitoring results to supervisors, as needed.

CRITERION-REFERENCED MEASURE

C6.22 Describe methods that may be used to monitor potential pollutors in a three- to five-page written report. Actions described must be consistent with agency policies regarding monitoring, and report must receive an acceptable rating according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students interview an agency head or supervisor to determine policies pertaining to monitoring of potential pollutors (E6.22.1).
2. Have students prepare case studies that outline examples of harassments (E6.22.2).
3. With the cooperation of a local business, simulate a situation requiring the establishment of a monitoring schedule. Design and conduct monitoring activities and have students prepare necessary reports (E6.22.1-E6.22.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared report guidelines
Instructor-prepared checklist on report

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--AIR, SOIL, AND WATER

TASK/COMPETENCY

6.23 Demonstrate ability to advise public on pollution problems

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

6.23

PERFORMANCE OBJECTIVE

P6.23 Given instruction on environmental protection, demonstrate the ability to advise the public on pollution problems by writing a newspaper article on a particular pollution problem (air, soil, water, noise, waste disposal). Satisfactory performance will be an acceptable rating of items on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.23.1 Research current information and data for a particular pollution problem.

E6.23.2 Demonstrate ability to prepare article in correct newspaper format.

E6.23.3 Demonstrate ability to use correct grammar, vocabulary, and spelling.

CRITERION-REFERENCED MEASURE

C6.23 Demonstrate the ability to advise the public on pollution problems by writing a newspaper article describing a particular pollution problem (air, soil, water, noise, waste disposal). Satisfactory performance will be an acceptable rating of items on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students identify current pollution problem(s) in the local community in order to determine the topic for a newspaper article (E6.23.1).
2. Instruct students on how to prepare article containing national, state, and local information related to the pollution problem (E6.23.1-E6.23.3).
3. Divide students into groups and assign groups to submit a series of articles to a local newspaper over a period of time in order to keep public advised on pollution problems (E6.23.1-E6.23.3).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on public advisement

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

6. PROTECTING THE ENVIRONMENT--
AIR, SOIL, AND WATER

TASK/COMPETENCY

6.24 Diagram a sewage disposal system

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

6.24

PERFORMANCE OBJECTIVE

P6.24 Given resources on waste disposal, diagram a sewage disposal system for a given farm or natural resource enterprise. An acceptable rating must be achieved on an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E6.24.1 Define terminology associated with a sewage disposal system.

E6.24.2 Examine local, state, and federal regulations concerning sewage disposal.

E6.22.3 List symbols used to describe components of disposal system.

E6.22.4 Compute size of disposal system requirements.

E6.22.5 Draw the sewage disposal system to scale.

E6.22.6 Define terminology associated with a sewage disposal system.

CRITERION-REFERENCED MEASURE

C6.24 Diagram a sewage disposal system for a given farm or natural resource enterprise. Each diagram will be evaluated using an instructor-prepared checklist and should receive an acceptable rating.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit two local sites requiring sewage disposal systems (E6.24.1-E6.24.6).
2. Locate references outlining regulations applicable to sewage disposal systems. Determine which regulations apply for a case situation (E6.24.2).
3. Have students determine size of system required and draw diagram to scale (E6.24.3-E6.24.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on sewage disposal system

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

TASKS/COMPETENCIES

7.1 Estimate the percent of slope

7.2 Classify land according to its capability to produce

7.3 Prepare seedbeds

7.4 Describe weed control measures

7.5 Outline plans for stockwater ponds

7.6 Identify procedures for improving the soil

7.7 Explain the effects of zoning

7.8 Demonstrate ability to use the pH Test Kit

7.9 Identify alternative land treatment plans

7.10 Develop farm land-use plans

7.11 Interpret land-use maps

7.12 Formulate the agricultural land-use section of a comprehensive plan for community development

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

7.1 Estimate the percent of slope

COURSE

Natural Resources Management III
(8040)

7.1

PERFORMANCE OBJECTIVE

P7.1 Given specifications and descriptions of a tract of land, estimate the percent of slope, using a slope finder. Student answers must correspond with those provided by the instructor, according to an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E7.1.1 Construct and/or secure a slope finder.

E7.1.2 Outline the procedures for using the slope finder.

E7.1.3 Determine the percent and direction of slope from the slope finder.

E7.1.4 Explain the relationship of the degree of slope to terms used in land capability classification.

E7.1.5 Define terminology associated with estimating the percent of slope.

E7.1.6 Apply mathematical skills associated with estimating the percent of slope.

CRITERION-REFERENCED MEASURE

C7.1 Estimate the percent of slope, using a slope finder. Student answers must correspond with those provided by the instructor, according to an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students construct a slope finder in order to determine the percent of slope (E7.1.1).
2. Demonstrate how to use a slope finder and discuss with students (E7.1.2).
3. Have students determine the slope of several locations using the slope finder after they have provided estimates of the slope (E7.1.2, E7.1.3, E7.1.5).
4. Have students determine the land capability classification based upon the percent of slope (E7.1.4).
5. Discuss with students terminology associated with estimating the percent of slope with students (E7.1.6).

SELECTED TOOLS AND MATERIALS

Slope finder
Instructor-prepared checklist

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Experiments in Soil Science, Logan S. Carter.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

7.2 Classify land according to its capability to produce

COURSE

Natural Resources Management IV
(8042)

7.2

PERFORMANCE OBJECTIVE

P7.2 Given resources on planning and managing land usage and appropriate county soil information, classify land according to its capability to produce, using the USDA Land Capability Classification System. Student's estimates should be consistent with county soil map classification, and answers must be considered acceptable according to instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E7.2.1 Define terminology associated with land classification.

E7.2.2 Examine eight categories of capability classification and determine characteristics of each category.

E7.2.3 Determine capability subclasses that are used to further describe the soils.

E7.2.4 Examine site and compare with characteristics of each category and determine the class of land.

E7.2.5 Compare ability of the land to produce a crop with its capability classification.

CRITERION-REFERENCED MEASURE

C7.2 Classify land according to its capability to produce, using the USDA Land Capability Classification System. Student's estimates should be consistent with county soil map classification, and answers must be considered acceptable according to instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students research the USDA Land Capability Classification System (E7.2.1, E7.2.2).
2. Secure soil map of the county and have students examine several sites to determine land capability classification (E7.2.1-E7.2.4).
3. Discuss how the land capability classification system is not an indication of fertility or productive capacity (E7.2.5).
4. Compare student's estimate of capability classification with the county soil map classification (E7.2.5).

SELECTED TOOLS AND MATERIALS

Shovel or pick
Slope finder
County soil map
Instructor-prepared worksheet on land classification

SELECTED AUDIOVISUAL MATERIALS

Soil Survey of (your own) County Virginia, USDA, Soil Conservation Service.

SELECTED REFERENCES

Books:
Conservation Farming, pp. 81, 82, Deere & Company.

Teaching Materials:
Land-Capability Classification, USDA, Soil Conservation Service.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

TASK/COMPETENCY

7.3 Prepare seedbeds

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

7.3

PERFORMANCE OBJECTIVE

P7.3 Given resources on land usage and access to a seedbed, prepare seedbeds for a particular crop. Procedures used must be consistent with established agricultural practices, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E7.3.1 List the characteristics of a good seedbed.

E7.3.2 Determine when soil can be tilled in various seasons.

E7.3.3 Identify advantages and disadvantages of plowing versus minimum tillage practices.

E7.3.4 Identify equipment used in preparing seedbeds.

E7.3.5 Explain relationship of the preparation of seedbed to the crop to be planted.

E7.3.6 Define terminology associated with seedbed preparation.

CRITERION-REFERENCED MEASURE

C7.3 Prepare seedbeds for a particular crop, using established agricultural practices. Procedures must be consistent with established practices, according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Determine crop to be planted and seedbed needs of crop by writing a list of crops on the blackboard for students (E7.3.1, E7.3.5).

2. Discuss with students the process of making the decision concerning the time of year to prepare seedbed by examining Extension Service recommendations for the locality (E7.3.2).

3. Have students prepare a list of equipment that could be used to prepare seedbeds and discuss terminology associated with preparation (E7.3.4, E7.3.6).

4. For a specific situation, have students prepare the seedbed, using locally donated equipment and supplies (P7.3).

SELECTED TOOLS AND MATERIALS

Fertilizer, herbicides, etc.
Seedbed preparation equipment (hand or powered)
Instructor-prepared checklist on preparing seedbeds

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Soils: Preparing the Soil for Planting, C. E. Richard.

CONTENT/CONCEPT

7. PLANNING AND MANAGING
LAND USAGE

TASK/COMPETENCY

7.4 Describe weed control measures

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

7.4

PERFORMANCE OBJECTIVE

P7.4 Given an instructor-prepared worksheet on land usage, describe weed control measures for situations developed by the instructor. Measures selected should be consistent with Cooperative Extension Service recommendations, and a score of 100 percent accuracy must be achieved on worksheet.

SELECTED ENABLING OBJECTIVES

E7.4.1 Identify mechanical, chemical, biological, or other means of weed control.

E7.4.2 Describe how weeds or weed seeds may be spread.

E7.4.3 Identify equipment used in weed control.

E7.4.4 Describe precautions to be followed in applying weed control measures.

E7.4.5 Define terminology associated with controlling weeds.

CRITERION-REFERENCED MEASURE

C7.4 Describe weed control measures for given situations on an instructor-prepared worksheet. Measures selected should be consistent with Cooperative Extension Service recommendations, and a score of 100 percent accuracy must be achieved on worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare a chart listing how weeds may be controlled mechanically, chemically, biologically, or through other means (E7.4.1).
2. Arrange for field trips to visit sites that use accepted weed control measures and compare with sites that do not use measures (E7.4.1, E7.4.2).
3. Have students collect newspaper or magazine clippings or personal examples of improper weed control practices or applications (E7.4.4).
4. Provide students with pictures and descriptions of various types of equipment used in weed control and define appropriate terminology (E7.4.3, E7.4.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on weed control measures
Instructor-prepared worksheet on weed control measures
Instructor-prepared situations on weed control
Cooperative Extension Service recommendations
Pictures of equipment

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Controlling Weeds, Vocational Agriculture Service.

CONTENT/CONCEPT

7. PLANNING AND MANAGING
LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

7.5 Outline plans for stockwater ponds

COURSE

Natural Resources Management IV
(8042)

7.5

PERFORMANCE OBJECTIVE

P7.5 Given a complete description of a particular stockwater pond site, outline plans for a stockwater pond on instructor-prepared worksheet. Plans must conform to recommendations of the local Soil Conservation Service.

SELECTED ENABLING OBJECTIVES

E7.5.1 Describe the characteristics of a desirable stockwater pond site.

E7.5.2 Determine size of stockwater pond required for livestock, irrigation, or other needs.

E7.5.3 List Soil Conservation Service recommendations after contact with local representative.

E7.5.4 Prepare plans and specifications, including cost figures.

E7.5.5 Apply mathematical skills,with planning stockwater ponds.

CRITERION-REFERENCED MEASURE

C7.5 Outline plans for a stockwater pond on an instructor-prepared worksheet. Plans must conform to recommendations of the local Soil Conservation Service.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Arrange for students to visit sites that represent desirable and undesirable locations for stockwater ponds (E7.5.1).

2. Invite Soil Conservation Service representative to desired site of stockwater pond for recommendations (E7.5.1-E7.5.3).

3. Assist students in developing working plans based upon consultation that could be presented to landowner (E7.5.4).

4. Explain mathematical processes required when planning stockwater ponds (E7.5.5).

SELECTED TOOLS AND MATERIALS

Drawing supplies
Soil Conservation Service recommendations
Instructor-prepared worksheet on stockwater ponds

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Building a Pond, USDA, Soil Conservation Service.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

TASK/COMPETENCY

7.6 Identify procedures for improving the soil

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

7.6

PERFORMANCE OBJECTIVE

P7.6 Given state guidelines, a description of an area with low fertility, and soil analysis reports, identify procedures for improving the soil on an instructor-prepared worksheet. Procedures listed must be consistent with the recommendations of the state agricultural experiment stations, according to guidelines provided, and a score of 100 percent accuracy must be achieved on worksheet.

SELECTED ENABLING OBJECTIVES

E7.6.1 Define terminology associated with soil improvement.

E7.6.2 Apply mathematical skills associated with soil improvement, e.g., cost-benefit figures or Universal Soil Loss Equation.

E7.6.3 Provide a description of area and soil analysis reports.

E7.6.4 List methods that may be used to improve soil.

E7.6.5 Explain advantages and disadvantages of each method.

E7.6.6 Identify procedures to be followed for incorporating each method.

CRITERION-REFERENCED MEASURE

C7.6 Identify procedures for improving the soil on an instructor-prepared worksheet. Procedures listed must be consistent with the recommendations of the state agricultural experiment stations, according to guidelines provided, and a score of 100 percent accuracy must be achieved on worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Arrange for students to visit local sites where soil improvement practices have been implemented (E7.6.4).

2. Have students discuss ways to improve soil and list each method on the blackboard (E7.6.4, E7.6.5).

3. Have students prepare a slide-tape presentation showing the before and after scenes of a site that has been improved (E7.6.1-E7.6.6).

SELECTED TOOLS AND MATERIALS

State guidelines for agricultural experiment stations
Instructor-prepared worksheet on soil improvement

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Conservation Farming, pp. 14-41, 80-89, 92-103, 130, 135, 136, Deere & Company.
Our Soils and Their Management, 4th ed., Roy L. Donahue, Roy H. Follet, and Rodney W. Tulloch.

CONTENT/CONCEPT

7. PLANNING AND MANAGING
LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

7.7 Explain the effects of zoning

COURSE

Natural Resources Management IV
(8042)

7.7

PERFORMANCE OBJECTIVE

P7.7 Given descriptions of supervised occupational programs and zoning regulations, explain the effects of zoning on selected situations involving these programs. Explanations must be rated acceptable according to instructor-provided checklist.

SELECTED ENABLING OBJECTIVES

E7.7.1 Define terminology associated with zoning.

E7.7.2 Determine differences in zoning laws in urban and rural portions of a county.

E7.7.3 Explain the concept of supervised occupational experience programs.

E7.7.4 Decide whether a program is in compliance with the applicable zoning board.

E7.7.5 Determine whether the program justifies applying for a variance.

CRITERION-REFERENCED MEASURE

C7.7 Explain the effects of zoning on selected situations involving supervised occupational programs. Explanations must be rated acceptable according to instructor-provided checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss terminology associated with zoning and explain items to students (E7.7.1).

2. Secure copies of the zoning regulations for a county and any urban areas within the county and have students note differences (E7.7.2).

3. Prepare examples of possible supervised occupational experience programs (E7.7.3).

4. For each case situation, examine the zoning regulations to determine whether a program is in compliance or whether a variance should be requested (E7.7.4, E7.7.5).

SELECTED TOOLS AND MATERIALS

Copy of local zoning regulations
Instructor-provided checklist on zoning
Instructor-prepared examples of supervised occupational experience programs
Case situations on zoning regulations

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

TASK/COMPETENCY

7.8 Demonstrate ability to use the pH Test Kit

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

7.8

PERFORMANCE OBJECTIVE

P7.8 Given access to soil samples, demonstrate ability to use the pH Test Kit. Determination of soil pH must correspond with 100 percent accuracy to the reading obtained by the instructor.

SELECTED ENABLING OBJECTIVES

E7.8.1 Define terminology associated with determining soil pH.

E7.8.2 Collect soil sample using established procedures.

E7.8.3 Follow directions contained in the Test Kit for determining pH.

E7.8.4 Compare color of liquid solution with color chart for pH.

E7.8.5 Identify the pH value based upon the color of liquid solution.

E7.8.6 Determine how to raise or lower soil pH values, if desirable.

CRITERION-REFERENCED MEASURE

C7.8 Demonstrate ability to use the pH Test Kit on various soil samples. Determination of soil pH must correspond with 100 percent accuracy to the reading obtained by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide students with a list of terminology associated with determining soil pH (E7.8.1).

2. Have students collect soil samples from locations that will have different pH values (E7.8.2).

3. Determine pH value for several different samples and then have students determine pH values (E7.8.3-E7.8.5).

4. Discuss how soil pH may be raised or lowered using soil fertilizers and other amendments (E7.8.6).

5. Have students determine soil pH values as a service for other teachers or students in the school (P7.8).

SELECTED TOOLS AND MATERIALS

Soil samples
pH Test Kit (e.g., Sudbury Soil Testing Equipment)
Instructor-prepared list of terminology

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
pH Test for Soil Acidity, Vocational Agriculture Service.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

7.9 Identify alternative land treatment plans

COURSE

Natural Resources Management V
(8044)

7.9

PERFORMANCE OBJECTIVE

P7.9 Given examples of specific sites for land usage, identify alternative land treatment plans by determining whether a specific site could be used for agricultural, woodland, recreational, wildlife habitat, or building site development. Alternatives must be judged acceptable on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E7.9.1 Identify soil types for a specific location.

E7.9.2 Locate soil type in soil survey of county.

E7.9.3 Explain restrictions placed upon soil type for different kinds of usage.

E7.9.4 List recommendations for alternative uses of a specific location.

CRITERION-REFERENCED MEASURE

C7.9 Identify alternative land treatment plans by determining whether a specific site could be used for agricultural, woodland, recreational, wildlife habitat, or building site development. Alternatives must be judged acceptable on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine county soil survey map to determine soil types of a specific location (E7.9.1, E7.9.2).

2. Have students examine tables to determine whether a soil type is suited for agricultural, woodland, recreational, wildlife habitat, or building site development (E7.9.3).

3. Have students prepare a chart giving their recommendations as to whether the site should be considered for alternative usages (E7.9.4).

SELECTED TOOLS AND MATERIALS

County soil survey map/tables
Instructor-prepared worksheet on land treatment

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Conservation Farming, pp. 14-41, 80-89, 130, 135, 136, Deere & Company.

Teaching Materials:
Soil Survey of (your own) County Virginia, USDA, Soil Conservation Service.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

7.10 Develop farm land-use plans

COURSE

Natural Resources Management V
(8044)

7.10

PERFORMANCE OBJECTIVE

P7.10 Given an aerial photograph of a local farm showing existing usages, develop farm land-use plans in a three- to five-page paper. Plans should project usage of the land for the next five years, be consistent with the farm operator's goals, and contain all factors included in C7.10. Paper must be judged acceptable by the instructor according to specified criteria.

SELECTED ENABLING OBJECTIVES

E7.10.1 Determine personal and production goals of the farm operator.

E7.10.2 Collect information on present usage of the farm.

E7.10.3 Examine site for alternative agricultural uses.

E7.10.4 Determine possible agricultural practices to be employed, e.g., crop rotation, strip cropping, contouring, terracing, etc.

E7.10.5 Define terminology associated with farm land-use planning.

CRITERION-REFERENCED MEASURE

C7.10 Develop farm land-use plans that project usage for the next five years in a three- to five-page paper. Plans should be consistent with the farm operator's goals, and should contain the following types of information:

1. Present usage
2. Projected usage for first to fifth year
3. Agricultural practices to be implemented or continued
4. Contingency plans for unexpected weather conditions.

Paper must be judged acceptable by the instructor, according to specific criteria.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students interview a local farmer to determine the person's personal and production goals projected for the farm site (E7.10.1).

2. Outline present usage of land on aerial photograph and discuss with students (E7.10.2).

3. Have students visit site to explore suitability for alternative agricultural uses (E7.10.3).

4. Have students prepare a written plan for the next five years detailing the information called for in C7.10 (E7.10.1-E7.10.5).

SELECTED TOOLS AND MATERIALS

Aerial photograph of local farm

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Conservation Farming, pp. 14-41, 80-89, 122-138, Deere & Company.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

TASK/COMPETENCY

7.11 Interpret land-use maps

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

7.11

PERFORMANCE OBJECTIVE

P7.11 Given a soil map showing present usage of land, interpret symbols indicating land use. Acceptable performance will be when interpretation includes all factors listed on instructor-prepared rating sheet.

SELECTED ENABLING OBJECTIVES

E7.11.1 Define terminology associated with land-use maps.

E7.11.2 Explain the symbols found on a land-use map.

E7.11.3 Determine possible uses for land in addition to determining present usage.

E7.11.4 Justify uses of land other than its present usage.

CRITERION-REFERENCED MEASURE

C7.11 Interpret land-use maps symbols. Acceptable performance will be when interpretation includes all factors listed on instructor-prepared rating sheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare transparency showing land use and have students review the symbols found on the map (E7.11.1, E7.11.2).

2. Prepare a practice set of questions to test students' understanding of land-use maps (E7.11.2, E7.11.3).

3. Invite a local planner or zoning administrator to review the topic with the class (E7.11.1-E7.11.4).

SELECTED TOOLS AND MATERIALS

Land-use maps
Practice questions
Instructor-prepared rating sheet on land-use interpretation
Instructor-prepared transparency showing land use

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Conserving Soil, USDA, Soil Conservation Service.

CONTENT/CONCEPT

7. PLANNING AND MANAGING LAND USAGE

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

7.12 Formulate the agricultural land-use section of a comprehensive plan for community development

COURSE

Postsecondary

7.12

PERFORMANCE OBJECTIVE

P7.12 Given appropriate planning data for a local county, formulate the agricultural land-use section that would be found in a written, comprehensive plan for community development. At least three other communities' plans should be reviewed before developing a local plan for agricultural land use, and plan must include all factors listed on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E7.12.1 Determine components of an agricultural land-use section of a comprehensive plan.

E7.12.2 Collect information and data necessary to this section of the plan.

E7.12.3 Determine format for reporting information.

E7.12.4 Describe procedure for holding public hearings on comprehensive plans.

E7.12.5 Prepare draft of the agricultural land-use section.

CRITERION-REFERENCED MEASURE

C7.12 Formulate the agricultural land-use section that would be found in a written, comprehensive plan for community development. At least three other communities' plans should be reviewed before developing a local plan for agricultural land use, and plan must include all factors listed on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure agricultural land-use sections of comprehensive plans for at least three communities or localities (E7.12.1).

2. Have students identify sources of information and data to be included in agricultural land-use section (E7.12.2).

3. Have students prepare a written report for the agricultural land-use section that is consistent with the format of the comprehensive plan (P7.12).

SELECTED TOOLS AND MATERIALS

Local community land-use data
Agricultural land-use plans (for various communities)
Instructor-prepared checklist on agricultural land use

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASKS/COMPETENCIES

8.1 Determine ration to feed fish

8.2 Develop a plan to provide food for animal and bird wildlife species

8.3 Seed, mulch, and fertilize waterholes

8.4 Identify game, waterfowl, and fish

8.5 Write plans for establishing a fish pond

8.6 Develop recommendations for maintaining ponds

8.7 Write a plan to manage a stream or lake

8.8 Propagate fish

8.9 Keep records of fish

8.10 Determine proper stocking rate in ponds

8.11 Identify elements for maintenance of a marsh for wildlife habitat

8.12 Raise game birds

8.13 Explain propagation of game animals

8.14 Operate a game animal-checking station during hunting seasons

8.15 Measure wildlife population

8.16 Demonstrate ability to manage wildlife

8.17 Report on the control of diseases and parasites in game animals

8.18 Describe the establishment of a wildlife preserve area

8.19 Develop recommendations to conduct a wildlife control program

8.20 Supervise operation of equipment and facilities for plant life projects

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.1 Determine ration to feed fish

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

8.1

PERFORMANCE OBJECTIVE

P8.1 Given a case study involving various numbers, types, and sizes of fish, determine ration to feed fish. Ingredients, size, and amount of feed must be consistent with USDA recommendations.

SELECTED ENABLING OBJECTIVES

E8.1.1 Determine percentages of protein, fat, carbohydrates, and fiber necessary for the fish ration.

E8.1.2 Identify ingredients for ration, considering availability and cost.

E8.1.3 Explain formulation of feed to be used.

E8.1.4 Identify amount and size of feed to be fed daily to various size fish.

E8.1.5 Determine proper time of day to feed fish.

E8.1.6 Determine if fish are feeding and correct problems when observed.

E8.1.7 Apply mathematical skills associated with feeding fish.

CRITERION-REFERENCED MEASURE

C8.1 Determine ration to feed fish. Ingredients, size, and amount of feed must be consistent with USDA recommendations.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit or observe the operation of a fish hatchery or fish farm. Game commission hatcheries could be visited (E8.1.1-E8.1.7).

2. Have students determine local suppliers of fish food and the size of the local market (E8.1.1, E8.1.2).

3. Have students calculate feed requirements for several case situations (E8.1.4).

4. Select two local ponds of similar size that contain similar fish. Have students conduct an experiment by feeding fish in one pond and not feeding fish in the second pond. Determine the effects upon size of fish after a specified length of time (E8.1.1-E8.1.7).

SELECTED TOOLS AND MATERIALS

Case study situations
Fish food
Instructor-prepared checklist on feeding fish

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: (1) Modern Fish Farms and (2) Fish Health Management, Fish Farming in the 80's Series, Vocational Education Productions.

SELECTED REFERENCES

Books:
Commercial Catfish Farming, 2nd ed., Jasper S. Lee.

Teaching Materials:
Catfish Farming, USDA, Soil Conservation Service.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.2 Develop a plan to provide food for animal and bird wildlife species

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

8.2

PERFORMANCE OBJECTIVE

P8.2 Given a situation involving a wildlife habitat, develop a plan to provide food for animal and bird wildlife species. The plans for providing food must be judged acceptable according to instructor-prepared checklist regarding the appropriateness of materials selected, the practicality and cost of plan implementation, and the provisions for the long-term supplying of natural food sources.

SELECTED ENABLING OBJECTIVES

E8.2.1 List ways of attracting animals and birds to a natural habitat.

E8.2.2 Identify plants or trees that provide food and/or cover for animals and birds.

E8.2.3 Determine natural food sources for animals and birds.

E8.2.4 List symptoms of wildlife starvation.

E8.2.5 Determine if additional plantings of food sources would be necessary.

E8.2.6 Explain process of supplementing natural food sources during shortages or severe weather.

CRITERION-REFERENCED MEASURE

C8.2 Develop a plan to provide food for animal and bird wildlife species that is judged acceptable by the instructor according to the appropriateness of materials selected, the practicality and cost of plan implementation, and the provisions for the long-term supplying of material food sources.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Survey the local community to determine food sources and their locations for bird and animal wildlife species (E8.2.1-E8.2.3).
2. Have the class or the local FFA Chapter sponsor the planting of wildlife food patches and recognize the participants (E8.2.1-E8.2.6).
3. Distribute wildlife feed to the local community when needed by animals and birds (E8.2.6).

SELECTED TOOLS AND MATERIALS

Soil preparation equipment
Plants, trees, or seeds for habitat or food
Instructor-prepared checklist on food provisions

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Wildlife Habitat Improvement Handbook, USDA, Forest Service.
Wildlife Management: Agricultural Education in Virginia Secondary Schools, Outdoor Empire Publishing, Inc.

Application

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.3 Seed, mulch, and fertilize waterholes

COURSE

Natural Resources Management IV
(8042)

8.3

PERFORMANCE OBJECTIVE

P8.3 Given access to a suitable location and necessary supplies, seed, mulch, and fertilize waterholes. Performance must be rated acceptable according to an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.3.1 Apply mathematical skills associated with seeding, mulching, and fertilizing waterholes.

E8.3.2 Locate waterholes suitable for bird habitats.

E8.3.3 Provide suitable feed for the birds by seeding waterholes.

E8.3.4 Apply mulch and fertilizer to the waterholes as needed.

CRITERION-REFERENCED MEASURE

C8.3 Seed, mulch, and fertilize waterholes to achieve an acceptable rating according to an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Assign students a project to observe the birds (especially ducks) found in the local community to determine present and potential sites for waterholes (E8.3.2).
2. Have groups of students (2-3 per group) prepare waterhole sites for bird habitats. Each group should determine the site's needs for seed, mulch, and fertilizer (E8.3.1-E8.3.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on seeding, mulching, fertilizing
Fertilizer
Mulch
Seed
Soil preparation equipment

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.4 Identify game, waterfowl, and fish

PROGRAM

NATURAL RESOURCES MANAGEMENT (03.0101)

COURSE

Natural Resources Management IV (8042)

8.4

PERFORMANCE OBJECTIVE

P8.4 Given resources on managing fish and wildlife, identify species of game, waterfowl, and fish. A minimum of 80 percent correct answers should be achieved on instructor-prepared test from actual, on-site observation, or from pictorial or written descriptions of species prepared by the instructor.

SELECTED ENABLING OBJECTIVES

E8.4.1 Compile a list of game, waterfowl, and fish species to be identified.

E8.4.2 Identify examples of pictorial and/or written descriptions of each species, including appropriate keys.

E8.4.3 List the major characteristics of the species.

E8.4.4 Identify the characteristics used to distinguish one species from another.

E8.4.5 Describe the natural habitat characteristics for each species.

CRITERION-REFERENCED MEASURE

C8.4 Identify species of game, waterfowl, and fish by scoring a minimum of 80 percent correct answers on instructor-prepared test. The test may be given from actual on-site observation, or from pictorial or written descriptions of each species.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students collect pictures of game, waterfowl, and fish species and mount pictures in a scrapbook along with the identifying characteristics (E8.4.1-E8.4.4).
2. Conduct field trips to identify species in their natural habitat or in confined settings, such as parks, zoos, game farms, aquariums, and hatcheries (E8.4.1-E8.4.5).
3. Invite persons knowledgeable of identification of game, waterfowl, or fish to conduct a seminar for the class (E8.4.1-E8.4.5).
4. Have students keep a written log for a specified time detailing the game, waterfowl, and fish species observed (E8.4.1-E8.4.4).
5. Invite a local conservation officer to stun fish in a pond with a shocker in order to aid student identification of species (E8.4.1-E8.4.5).

SELECTED TOOLS AND MATERIALS

Binoculars
Pictorial descriptions of wildlife species
Instructor-prepared test on identification of species

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
The Hunter's Field Guide to the Game Birds and Animals of North America, Robert Elman.
McClane's Field Guide to Freshwater Fishes of North America, Albert J. McClane.

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 18-28, 58-66, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.5 Write plans for establishing a fish pond

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

8.5

PERFORMANCE OBJECTIVE

P8.5 Given access to a suitable site, write plans for establishing a fish pond. The plans for construction must follow Soil Conservation Service recommendations for the particular site. The local SCS representative should approve written plans for the fish pond, and plans must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.5.1 Describe the characteristics of a desirable pond site.

E8.5.2 Determine the minimum pond depth required to supply fish production and recreational needs.

E8.5.3 Identify the properties of soils at the pond site.

E8.5.4 Explain procedure to follow to contact an engineer, technician, or other resource person to prepare plans and specifications, including cost figures.

E8.5.5 Describe techniques required to prepare the site for pond construction.

E8.5.6 Construct the pond, including necessary spillways and dams.

E8.5.7 Describe method of sealing ponds to prevent leakage.

E8.5.8 Explain procedure used in establishing vegetation around pond and on dam to prevent soil erosion.

E8.5.9 Determine stocking rates of desirable species.

E8.5.10 Identify lifesaving equipment to store in an accessible location.

E8.5.11 Define terminology associated with a fish pond.

E8.5.12 Apply mathematical skills associated with establishing a fish pond.

CRITERION-REFERENCED MEASURE

C8.5 Write plans for establishing a fish pond that is constructed according to Soil Conservation Service recommendations for a particular site. The SCS representative should approve written plans, and plans must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit two ponds that represent a desirable and an undesirable site to examine differences between the two (E8.5.1).

2. Draw plans for a particular site and have them reviewed by the Soil Conservation Service (E8.5.4).

3. Arrange for students to construct the pond for a local landowner or municipality and arrange for field trip usage of the site (E8.5.1-E8.5.12).

SELECTED TOOLS AND MATERIALS

Instructor-prepared plans for fish pond
Instructor-prepared checklist on fish ponds
Soil Conservation Service recommendations for pond construction

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Modern Fish Farms, Fish Farming in the 80's Series, Vocational Education Productions.

SELECTED REFERENCES

Books:
Outdoors, USA, The Yearbook of Agriculture, USDA.

Teaching Materials:
Building a Pond, USDA, Soil Conservation Service.
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 67-72, Outdoor Empire Publishing, Inc.

Application

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.6 Develop recommendations for maintaining ponds

COURSE

Natural Resources Management IV
(8042)

8.6

PERFORMANCE OBJECTIVE

P8.6 Given access to an established fish pond, develop recommendations for maintaining the pond to ensure that an optimal production of desirable fish is harvested. Case study records should be used for the development of recommendations, and recommendations must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.6.1 Perform necessary inspections of the pond site.

E8.6.2 Keep ground covers in good condition at the pond site.

E8.6.3 Provide protection to shoreline from wave action.

E8.6.4 Control burrowing animals, beavers, and insects at the pond site.

E8.6.5 Keep trash and debris from spillways and pipes.

E8.6.6 Follow recommendations for fertilizing pond and using chemical and biological controls for algae and weeds.

E8.6.7 Determine availability of desirable species and control undesirable species.

E8.6.8 Determine food availability for fish and record growth of each species.

E8.6.9 Evaluate water quality of the pond.

E8.6.10 Arrange for sufficient fishing of the pond to ensure a chance for growth of fish.

E8.6.11 Determine if lifesaving equipment is still accessible or needs repair or replacement.

CRITERION-REFERENCED MEASURE

C8.6 Develop recommendations for maintaining an established fish pond to ensure the harvest of the optimal production of desirable fish. Recommendations for maintenance of the pond should be developed using case study records, and recommendations must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students maintain a local pond to incorporate practices associated with each of the enabling objectives (E8.6.1-E8.6.11).
2. Conduct an examination of a pond site to determine pH, hardness, oxygen concentration, weeds, algae, temperature, muddiness, and depth (E8.6.9).
3. Have students prepare a written report on one or more aspects of pond management (E8.6.1-E8.6.11).
4. Encourage students who have conducted experience programs in this area to apply for the appropriate FFA proficiency award (P8.6).

SELECTED TOOLS AND MATERIALS

Case study records
Seine
Wire traps
Instructor-prepared checklist on maintaining ponds

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Modern Fish Farms, Fishing Farming in the 80's Series, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Building a Pond, USDA, Soil Conservation Service.
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 67-72, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.7 Write a plan to manage a stream or lake

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

8.7

PERFORMANCE OBJECTIVE

P8.7 Given access to a nearby stream or lake, write a plan to manage the stream or lake for multiple usages by the public. A written plan of usage and management practices should be devised and approved by the instructor according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.7.1 Describe the necessary inspections of the stream or lake.

E8.7.2 Determine how to establish and maintain ground covers and trees at stream or lake.

E8.7.3 Explain importance of providing protection to shoreline from current and wave action.

E8.7.4 List methods to control animals and insects at stream or lake, especially around public eating areas.

E8.7.5 Provide for litter and debris removal from site.

E8.7.6 Determine possible public usages and plan facilities needed to accommodate the activity.

E8.7.7 Explain procedures used to evaluate water quality, food availability for fish, and numbers of desirable and undesirable fish species.

E8.7.8 Identify recommended practices for fertilizing lake and using chemical and biological controls for algae and weeds.

E8.7.9 Monitor usages of stream or lake by public.

E8.7.10 Define terminology associated with managing a stream or lake.

CRITERION-REFERENCED MEASURE

C8.7 Write a plan to manage a stream or lake for multiple usages by the public. A written plan of usage and management practices should be devised and approved by the instructor according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students manage a nearby stream or lake to incorporate practices associated with each of the enabling objectives (E8.7.1-E8.7.10).
2. Conduct an examination of a stream or lake to determine pH, hardness, oxygen concentration, weeds, algae, temperature, muddiness and depth (E8.7.7).
3. Assign students to prepare a written report on one or more aspects of stream or lake management (E8.7.1-E8.7.10).
4. Encourage students who have conducted experience programs in this area to apply for the appropriate FFA proficiency award (P8.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on managing stream

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
The Stream Conservation Handbook, J. Michael Migel.

Teaching Materials:
Logging and Fish Habitat, USDA, Forest Service.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.8 Propagate fish

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

8.8

PERFORMANCE OBJECTIVE

P8.8 Given access to nearby stream or lake and resources on managing fish, propagate fish. Performance must be acceptable according to instructor-devised standards established for each species, and records must be maintained for two months to determine if standards are met or exceeded.

SELECTED ENABLING OBJECTIVES

E8.8.1 Collect sperm and then fertilize eggs.

E8.8.2 Calculate time and frequency of fertilization.

E8.8.3 Identify diseased and unfertilized eggs.

E8.8.4 Determine proper amount of food for fry.

E8.8.5 Check oxygen level, pH, temperature, and hardness of water.

CRITERION-REFERENCED MEASURE

C8.8 Propagate fish. Performance must be acceptable according to instructor-devised standards established for each species, and records must be maintained for two months to determine if standards are met or exceeded.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit or observe the operation of a fish hatchery, especially noting the techniques used to propagate fish (E8.8.1-E8.8.5).

2. Secure an aquarium for the classroom and have students learn the principles of fish propagation using tropical fish (E8.8.1-E8.8.5).

3. Have students research spawning habits of major species of fish located in Virginia and compare with hatchery techniques (E8.8.1-E8.8.5).

SELECTED TOOLS AND MATERIALS

Aquarium
Tropical fish
Instructor-devised standards for fish propagation

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: (1) Modern Fish Farms and (2) Fish Health Management, Fish Farming in the 80's Series, Vocational Education Productions.

SELECTED REFERENCES

Books:
Commercial Catfish Farming, 2nd edition, Jasper S. Lee.

Application

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.9 Keep records of fish

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

8.9

PERFORMANCE OBJECTIVE

P8.9 Given case study situations and the appropriate forms, demonstrate ability to keep records of fish. The completed recordkeeping form must correspond with 100 percent accuracy to the figures on the instructor-prepared form.

SELECTED ENABLING OBJECTIVES

E8.9.1 Keep record of fish taken in a particular area.

E8.9.2 Inventory species of fish found in particular area.

E8.9.3 Determine average yearly growth of fish species in a particular body of water and record data.

E8.9.4 Apply mathematical skills associated with recordkeeping.

E8.9.5 Keep work diaries and logs showing activities performed and numbers of fish involved.

E8.9.6 Prepare illustrations, tables, and graphs for data gathered.

CRITERION-REFERENCED MEASURE

C8.9 Demonstrate ability to keep records of fish for several case study situations. The completed recordkeeping form should correspond with 100 percent accuracy to the figures on the instructor-prepared form.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Determine the records that students should keep related to fish (P8.9).
2. Prepare case study data that could be used by the students in completing the required records. Have students complete records requiring several types of data (E8.9.1-E8.9.6).
3. Recognize all students who keep records that meet the instructor's criteria for acceptability (P8.9).

SELECTED TOOLS AND MATERIALS

Case study records of fish
Instructor-prepared recordkeeping form for fish

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Commercial Catfish Farming, 2nd edition, Jasper S. Lee.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.10 Determine proper stocking rate in ponds

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

8.10

PERFORMANCE OBJECTIVE

P8.10 Given a case-study situation involving a pond, determine proper stocking rate in ponds for managing fish. Rates must be consistent with the recommendations of the Virginia Commission of Game and Inland Fisheries.

SELECTED ENABLING OBJECTIVES

E8.10.1 Calculate surface and running water volume.

E8.10.2 Explain method of collecting fish to determine average size in the pond.

E8.10.3 Identify procedure to remove undesirable species and too-small fish to reach optimal stocking level.

E8.10.4 Provide for adequate removal of harvestable fish.

E8.10.5 Apply mathematical skills associated with maintaining proper stocking rate.

CRITERION-REFERENCED MEASURE

C8.10 Determine proper stocking rate in ponds for managing fish. Rates must be consistent with the recommendations of the Virginia Commission of Game and Inland Fisheries.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure the assistance of a local conservation officer to help the class in determining the proper stocking rate for a pond (E8.10.1-E8.10.5).
2. Examine a local pond and have students determine if the fish population is in balance with recommendations (P8.10).
3. Secure the assistance of a local landowner and provide help in draining a pond and restocking using guidelines of the Virginia Commission of Game and Inland Fisheries (E8.10.1-E8.10.5).

SELECTED TOOLS AND MATERIALS

Guidelines of the Virginia Commission of Game and Inland Fisheries
Pond drainage equipment or seines
Hatchery fish

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 67-70, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.11 Identify elements for maintenance of a marsh for wildlife habitat

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

8.11

PERFORMANCE OBJECTIVE

P8.11 Given access to a suitable marsh land, identify elements for maintaining a marsh for wildlife habitat in a written report. Report must include an inventory of present plant life, a determination of the best-suited plant species, and a description of planting-area preparation.

SELECTED ENABLING OBJECTIVES

E8.11.1 Define terminology associated with marshes and wetlands.

E8.11.2 Describe existing plant material and wildlife found on marsh site.

E8.11.3 Determine type of marsh and salt content of water.

E8.11.4 Identify procedures to secure suitable plant materials for type of marsh identified.

E8.11.5 Explain methods used to prepare area for seeding or planting.

CRITERION-REFERENCED MEASURE

C8.11 Identify elements for maintaining a marsh for wildlife habitat in a written report. Report must include an inventory of present plant life, a determination of the best suited plant species, and a description of planting-area preparation.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine a local marsh site and determine its suitability for wildlife habitat (E8.11.1, E8.11.2).
2. Identify natural plant materials of the marsh and discuss with students (E8.11.2).
3. Have students prepare a written report outlining how to best maintain the marsh (E8.11.3-E8.11.5).

SELECTED TOOLS AND MATERIALS

None identified

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 42-45, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.12 Raise game birds

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

8.12

PERFORMANCE OBJECTIVE

P8.12 Given access to a suitable location, raise game birds. Performance must be acceptable according to instructor-prepared standards established for each species, and records must be maintained for three months to show that standards have been met or exceeded.

SELECTED ENABLING OBJECTIVES

E8.12.1 Select breeding stock.

E8.12.2 Secure and prepare equipment for incubating, hatching, and brooding eggs and chicks.

E8.12.3 Incubate and hatch eggs and then brood chicks.

E8.12.4 Raise birds by supplying water, feed, temperature, and moisture for optimum conditions.

E8.12.5 Trim bills and clip wings.

E8.12.6 Identify and treat diseases.

E8.12.7 Explain methods of controlling predatory animals.

E8.12.8 Prepare for and conduct sale or distribution of birds.

E8.12.9 Keep necessary records for both production and financial purposes.

E8.12.10 Define terminology associated with game bird production.

E8.12.11 Apply mathematical skills associated with game bird production.

CRITERION-REFERENCED MEASURE

C8.12 Raise game birds. Performance must be acceptable according to instructor-prepared standards established for each species and records must be maintained for three months to show that standards have been met or exceeded.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Make arrangements for raising game birds at a site convenient to the school. Have students perform each of the tasks associated with raising game birds (E8.12.1-E8.12.11). .
2. Have students with appropriate facilities conduct the raising of game birds as a part of their supervised occupational experience (P8.12).
3. Have the class or FFA Chapter be responsible for raising game birds in cooperation with a local organization devoted to wildlife preservation (P8.12).

SELECTED TOOLS AND MATERIALS

Incubators
Brooders
Pens
Instructor-prepared standards for raising game birds

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: (1) An Introduction to Game Birds and (2) Brooding, Game Bird Management Kit Series, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Stocking with Quail and Pheasant, Vocational Agriculture Service.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.13 Explain propagation of game animals

COURSE

Natural Resources Management V
(8044)

8.13

PERFORMANCE OBJECTIVE

P8.13 Given resources on managing wildlife, explain the propagation of game animals. A written plan for propagation of a particular game species should be approved according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.13.1 Select breeding stock on the basis of size, color, vigor, or other desired characteristics.

E8.13.2 Select breeds that are adaptable to the local area.

E8.13.3 Identify signs of estrus in game animals.

E8.13.4 Describe mating procedures for game animals.

E8.13.5 Explain safety precautions to be followed in propagating game animals.

CRITERION-REFERENCED MEASURE

C8.13 Explain the propagation of game animals. A written plan for propagation of a particular game species should be approved according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Visit or observe the operation of a game farm, especially noting the propagation of game animals (E8.13.1-E8.13.5).
2. Place students on game farms for supervised occupational experience. Students are to assist in the propagation of game animals as directed by their supervisor (E8.13.1-E8.13.5).
3. Have students prepare a written report for a particular game species including information for each of the enabling objectives (E8.12.1-E8.13.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist for game propagation

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.14 Operate a game animal-checking station during hunting seasons

COURSE

Postsecondary

8.14

PERFORMANCE OBJECTIVE

P8.14 Given access to a station, operate a game animal-checking station during hunting seasons. All procedures and regulations established by the Virginia Commission of Game and Inland Fisheries must be followed and approved by the instructor.

SELECTED ENABLING OBJECTIVES

E8.14.1 Determine the requirements to meet in order to operate a game animal-checking station.

E8.14.2 Describe game laws for a particular species, including hunting seasons and special restrictions to be observed such as size, sex, number, etc.

E8.14.3 Examine game brought to the checking station.

E8.14.4 Record information required for check-in.

E8.14.5 Report unusual circumstances or incidents to proper authority.

E8.14.6 Keep records accurately and up to date.

CRITERION-REFERENCED MEASURE

C8.14 Operate a game animal-checking station during hunting seasons, following the procedures and regulations of the Virginia Commission of Game and Inland Fisheries, with instructor approval.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct research to determine the requirements to be met in order to conduct a game animal-checking station (E8.14.1).

2. Visit a game animal-checking station during hunting season and have students question the operator regarding the checking station (E8.14.1-E8.14.6).

3. Have students select a game animal-checking station near their home and keep weekly records of animals checked in (E8.14.6).

SELECTED TOOLS AND MATERIALS

Samples of game tags
Regulations of the Virginia Commission of Game and Inland Fisheries

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.15 Measure wildlife population

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

8.15

PERFORMANCE OBJECTIVE

P8.15 Given access to a suitable population, measure wildlife population, using the techniques of a complete count, a sample-area count, and fecal-pellet group count. Measurement should be within 10 percent of the instructor's estimate.

SELECTED ENABLING OBJECTIVES

E8.15.1 List methods for measuring wildlife population.

E8.15.2 List two advantages and two disadvantages for each method.

E8.15.3 Select the method(s) appropriate for the wildlife species to be counted.

E8.15.4 Define terminology associated with measuring wildlife populations.

E8.15.5 Apply mathematical skills associated with measuring wildlife populations.

CRITERION-REFERENCED MEASURE

C8.15 Measure wildlife population, using the techniques of a complete count, a sample-area count, and a fecal-pellet group count. Measurement should be within 10 percent of the instructor's estimate.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students determine the method(s) used to measure or estimate wildlife populations for a farm, a county, a state, or the nation (E8.15.1).
2. Invite a conservation officer to speak to the class about measuring wildlife populations (E8.15.1-E8.15.5).
3. Have students review records of game animals harvested over a ten-year period and compare with estimates of total population counts (E8.15.1-E8.15.3).

SELECTED TOOLS AND MATERIALS

None identified

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Wildlife Management Techniques Manual, 4th ed., The Wildlife Society.

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 29-37, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

TASK/COMPETENCY

8.16 Demonstrate ability to manage wildlife

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

8.16

PERFORMANCE OBJECTIVE

P8.16 Given reference materials and a case study, demonstrate ability to manage wildlife populations by preparing a list of written recommendations for the particular situation. The instructor must concur that the list of recommendations is feasible and consistent with accepted management practices.

SELECTED ENABLING OBJECTIVES

E8.16.1 Inventory available feed for wildlife.

E8.16.2 Determine the balance of animals to food supply.

E8.16.3 Determine physical condition of wildlife.

E8.16.4 Evaluate wildlife habitat.

E8.16.5 Recommend stocking or thinning procedures.

E8.16.6 Apply mathematical skills associated with managing wildlife.

CRITERION-REFERENCED MEASURE

C8.16 Demonstrate ability to manage wildlife by preparing written recommendations for a case study situation. Recommendations must be reviewed by the instructor for feasibility and consistency with accepted management practices.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare case study materials describing a hypothetical or actual situation requiring wildlife management practices (P8.16).
2. Have students review materials noting information supplied relating to each enabling objective (E8.16.1-E8.16.6).
3. Review list of management recommendations prepared by each student and compare with instructor's recommendations (P8.16).

SELECTED TOOLS AND MATERIALS

Case study materials

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Managing Wildlife: Is It For You?, Vocational Education Productions.

SELECTED REFERENCES

Books:
Wildlife Management, Robert H. Giles, Jr.
Wildlife Management Techniques Manual, 4th ed., The Wildlife Society.

Teaching Materials:
A Forester's Guide to Observing Wildlife Use of Forest Habitat in the South, USDA, Forest Service.

CONTENT/CONCEPT

8. MANAGE FISH AND WILDLIFE

TASK/COMPETENCY

8.17 Report on the control of diseases and parasites in game animals

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

8.17

PERFORMANCE OBJECTIVE

P8.17 Given appropriate guidelines, report on the control of diseases and parasites of a particular game species. The written report must include a list of major diseases and parasites of the game species, symptoms of infestation, control measures for captive and wild populations, and possible preventive measures for disease or parasites.

SELECTED ENABLING OBJECTIVES

E8.17.1 List diseases and parasites of a particular game animal species.

E8.17.2 Describe symptoms of animals with disease or parasite infestation.

E8.17.3 Identify possible control measures to be employed to lessen or eradicate disease.

E8.17.4 Devise possible preventive measures to lessen possibility of disease or parasite attack.

CRITERION-REFERENCED MEASURE

C8.17 Report on the control of diseases and parasites of a particular game species in a written report. The report must include a list of major diseases and parasites of the game species, symptoms of infestation, control measures for captive and wild populations, and possible preventive measures for disease or parasites.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students select a particular game species and research its major diseases and parasites (E8.17.1).
2. Invite a local game warden to speak to the class about local problems with diseases or parasites of wildlife (E8.17.1-E8.17.4).
3. Have students interview a local veterinarian to determine diseases and parasites of domestic animals that also affect wildlife (E8.17.1).

SELECTED TOOLS AND MATERIALS

None identified

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Wildlife Management, Robert H. Giles, Jr.
Wildlife Management Techniques Manual, 4th ed., The Wildlife Society.

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 48-52, Outdoor Empire Publishing, Inc.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.18 Describe the establishment of a wildlife preserve area

COURSE

Postsecondary

8.18

PERFORMANCE OBJECTIVE

P8.18 Given access to local sites, describe the establishment of a wildlife preserve area by examining a local wildlife management area and developing a written report. Report must include the criteria listed in C8.18 and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.18.1 Define wildlife refuge, wildlife sanctuary, wildlife reservation, and hunting preserve.

E8.18.2 Determine need for establishing a wildlife preserve.

E8.18.3 Explain procedure to inspect site to determine suitability for wildlife (water, food, cover).

E8.18.4 Describe ways that boundaries can be clearly identified.

E8.18.5 Develop a plan for security of wildlife preserve from humans, fire, and predators.

E8.18.6 Explain the duties performed by the manager of the wildlife management area.

CRITERION-REFERENCED MEASURE

C8.18 Describe a wildlife preserve area by examining a local wildlife management area and developing a written report. Report must be judged acceptable according to instructor-prepared checklist and include the following criteria:

a. Description of wildlife management area and its resources
b. How the area's boundaries are marked
c. Security provisions
d. Job description for the manager of the area.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students secure maps of the wildlife management areas located in Virginia (E8.18.1).
2. Select a local wildlife preserve and have students visit to collect information for their written report. Groups could be assigned to the pieces of information listed in C8.18 (E8.18.2-E8.18.6).
3. Have students interview the manager of a local wildlife preserve and have the person describe their job (E8.18.6).
4. Assign students placed in supervised occupational experience programs to work at a local wildlife preserve (E8.18.2-E8.18.6).

SELECTED TOOLS AND MATERIALS

Maps of state's wildlife management areas
Instructor-prepared checklist on wildlife preserves

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Wildlife Management, Robert H. Giles, Jr.

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.19 Develop recommendations to conduct a wildlife control program

COURSE

Postsecondary

8.19

PERFORMANCE OBJECTIVE

P8.19 Given resources on managing wildlife, develop recommendations to conduct a wildlife control program for case study situations developed by the instructor. Recommendations should be consistent with those of a wildlife control specialist and approved according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.19.1 Determine need or practicality of wildlife control programs.

E8.19.2 List damages caused by wildlife that require control programs.

E8.19.3 Determine if problem is short or long term by reviewing the animal's habits.

E8.19.4 Relate the legal status of the animal under federal and/or state wildlife laws.

E8.19.5 Identify a control measure that will alleviate the problem situation (extermination, prevention, environmental change, or physiological control).

E8.19.6 Keep records to determine if control program is indeed working.

CRITERION-REFERENCED MEASURE

C8.19 Develop recommendations to conduct a wildlife control program for case study situations developed by the instructor. Recommendations should be consistent with those of a wildlife control specialist and approved according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare case studies of situations requiring (and not requiring) wildlife control programs (E8.19.1-E8.19.6).
2. Have students research effective and ineffective programs of wildlife control (E8.19.1).
3. Have students survey the local area to determine problems or damages caused by wildlife (E8.19.2).
4. Have students prepare written recommendations for each case study (E8.19.1-E8.19.6).

SELECTED TOOLS AND MATERIALS

Case studies involving wildlife control situations
Instructor-prepared checklist on wildlife-control program

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Wildlife Management, Robert H. Giles, Jr.

Teaching Materials:
Wildlife Management: Agricultural Education in Virginia Secondary Schools, pp. 49-50, Outdoor Empire Publishing, Inc.

Application

CONTENT/CONCEPT

8. MANAGING FISH AND WILDLIFE

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

8.20 Supervise operation of equipment and facilities for plant life projects

COURSE

Postsecondary

8.20

PERFORMANCE OBJECTIVE

P8.20 Given an actual or simulated supervisory position, supervise the operation of equipment and facilities for plant life projects. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E8.20.1 Make recommendations for food, cover, planting, etc.

E8.20.2 Provide technical assistance in tree and shrub planting.

E8.20.3 Supervise preparation of seed beds.

E8.20.4 Identify particular habitats of local fauna.

E8.20.5 Plant, maintain, or manage plants for a particular animal species to supply food and/or cover.

CRITERION-REFERENCED MEASURE

C8.20 Supervise the operation of equipment and facilities for plant life projects. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students select a local site that could be developed for plant life projects (E8.20.1).
2. Develop the site using student recommendations (E8.20.1).
3. Continue developing the site yearly by incorporating changes suggested by students (E8.20.1-E8.20.5).
4. Have students serve in a supervisory role for a period of time and rate their performance, using an instructor-prepared checklist (E8.20.1-E8.20.5).

SELECTED TOOLS AND MATERIALS

Area for plant life projects
Cultivation and pruning equipment and tools
Instructor-prepared checklist for supervision of plant life

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

9. MANAGING THE FOREST

TASKS/COMPETENCIES

9.1 Identify, by common name, tree species native in region

9.2 Identify and name forest products

9.3 Produce Christmas trees

9.4 Calculate volume of pulpwood

9.5 Estimate the volume of standing timber on a given tract

9.6 Demonstrate knowledge of tree fertilization

9.7 Identify regeneration techniques necessary for the continuous growth of trees

9.8 Design plans to establish forest roads

9.9 Develop a plan for the management of a forest

9.10 Plan a timber stand improvement project of planting, thinning, and pruning a stand of uneven-aged or even-aged forests

9.11 Manage a forest harvesting plot

CONTENT/CONCEPT

9. MANAGING THE FOREST

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

9.1 Identify, by common name, tree species native in region

COURSE

Natural Resources Management III
(8040)

9.1

PERFORMANCE OBJECTIVE

P9.1 Provided with appropriate reference material and samples of local tree species, identify the tree species native in region by common name. Acceptable performance will be correctly spelling and identifying 80 percent of the trees listed on instructor-prepared worksheet when shown samples.

SELECTED ENABLING OBJECTIVES

E9.1.1 Determine the common native tree species of a region.

E9.1.2 Locate reference material containing tree species native to a region.

E9.1.3 Compare reference material description to observed characteristics of tree.

E9.1.4 Demonstrate ability to use a key to assist in the identification of the tree.

E9.1.5 Determine most-likely site to find a particular tree species.

E9.1.6 Spell the common names of the tree species correctly.

CRITERION-REFERENCED MEASURE

C9.1 Identify the native tree species of a region by their common name when shown samples. At least 80 percent of the trees on instructor-prepared worksheet should be correctly identified, including the proper spelling.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare a list of the 20 most common tree species of a region, along with their identifying characteristics. Conduct field trips to locate and identify these trees on-site (E9.1.1-E9.1.6).
2. Have students use a small tree to prepare a model that has the parts of a tree labeled (E9.1.3, E9.1.4).
3. Prepare an arboretum containing the native tree species (P9.1).
4. Use local county maps and mark them to indicate heavy concentrations of tree species (E9.1.5).
5. Encourage students to participate in FFA contest events emphasizing tree identification (E9.1.1-E9.1.6).

SELECTED TOOLS AND MATERIALS

Local county maps
Samples of local tree species
Instructor-prepared worksheet on tree identification

SELECTED AUDIOVISUAL MATERIALS

Slides: Tree Identification, Ohio Agricultural Education Curriculum Materials Service.

SELECTED REFERENCES

Teaching Materials:

A Forest Atlas of the South, USDA, Forest Service.
Identifying Hardwoods Growing on Pine Sites, USDA, Forest Service.
Important Forest Tress of the United States, USDA, Forest Service.
Teaching Tree Identification, Ohio Agricultural Education Curriculum Materials Service.
Tree Identification, Ohio Agricultural Education Curriculum Materials Service.
The Woodland Bark of Hardwoods Growing on Southern Pine Sites--A Pictorial Atlas, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

9.2 Identify and name forest products

COURSE

Natural Resources Management III
(8040)

9.2

PERFORMANCE OBJECTIVE

P9.2 Given access to an on-site location in the woods, identify and name forest products that could be secured from the site. Acceptable peformance will be naming at least 80 percent of the products found on the instructor-prepared list.

SELECTED ENABLING OBJECTIVES

E9.2.1 List the industries that require wood.

E9.2.2 Differentiate forest products into raw and finished categories.

E9.2.3 Identify common product uses for a particular tree species.

CRITERION-REFERENCED MEASURE

C9.2 Identify and name forest products that could be secured from a particular site with 80 percent accuracy on instructor-prepared list of forest products.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare posters that depict what happens to a tree upon harvesting. Assign or have each group select a different tree species so that a variety of products may be shown (E9.2.3).

2. Explain procedure to differentiate raw forest products and finished categories (E9.2.2).

3. Visit a sawmill and a wood-products distributor to discover traditional and new uses of wood (E9.2.1).

SELECTED TOOLS AND MATERIALS

Instructor-prepared list of forest products

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Wood Handbook: Wood as an Engineering Material, USDA Forest Service.

Teaching Materials:
Forest for our Needs: 1979 Research Accomplishments, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

9.3 Produce Christmas trees

COURSE

Natural Resources Management III
(8040)

9.3

PERFORMANCE OBJECTIVE

P9.3 Given access to a suitable site and an available market, produce Christmas trees for optimal production on a given site. A written plan, containing the data listed in C9.3, must be developed and approved according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E9.3.1 Determine characteristics of a desirable site.

E9.3.2 Select suitable varieties for Christmas tree production.

E9.3.3 Purchase adequate, healthy tree stock for the site.

E9.3.4 Plant trees according to accepted procedure either by hand or machine.

E9.3.5 Prune and shape trees on a recommended schedule.

E9.3.6 Provide fertilizer, insecticide, pesticide, or protection from animals as needed.

E9.3.7 Harvest, grade, and tie trees to be removed from site.

E9.3.8 Arrange for on- or off-site marketing of trees.

E9.3.9 Keep adequate records to determine profit or loss.

E9.3.10 Define terminology associated with producing Christmas trees.

E9.3.11 Apply mathematical skills associated with producing Christmas trees.

CRITERION-REFERENCED MEASURE

C9.3 Produce Christmas trees for optimal production on a given site. The written plan should be approved according to instructor-prepared checklist and contain the following information.

1. Why is this site suitable?
2. What varieties should be planted?
3. How many trees should be planted?
4. How should the trees be planted?
5. How should the trees be maintained?
6. What problems may be encountered?
7. How will the trees be harvested?
8. How will the trees be marketed?
9. What records must be kept?

SELECTED INSTRUCTIONAL ACTIVITIES

1. Explain procedure to follow to prepare a written plan for Christmas tree production that answers the questions listed in C9.3 (E9.3.1-E9.3.11).

2. Develop an FFA Christmas tree plot and have students be responsible for the site management (E9.3.1-E9.3.9).

3. Have students conduct this activity in their occupational experience program and encourage them to later apply for a proficiency award (P9.3).

SELECTED TOOLS AND MATERIALS

Chain saw
Hand shears
Mattock
Planting bar
Pruners
Pruning saw
Shovel
FFA Christmas tree plot
Instructor-prepared checklist on Christmas tree production

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Growing and Selling Christmas Trees, Vocational Agriculture Service.
Growing Christmas Trees in the South, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

TASK/COMPETENCY

9.4 Calculate volume of pulpwood

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

9.4

PERFORMANCE OBJECTIVE

P9.4 Given a written set of dimensions, the actual pulp sticks, or a standing tree, calculate the volume of pulpwood. The calculations must be within ±5 percent of the instructor's calculations.

SELECTED ENABLING OBJECTIVES

E9.4.1 Define terminology associated with calculation of pulpwood volume such as cord, cubic feet, or cubic meter.

E9.4.2 Use tape to determine width, height, and bolt length of stacked rick in feet.

E9.4.3 Use Biltmore stick to determine number of pulp sticks in standing timber.

E9.4.4 Convert measurements to measure desired (cord, cubit feet, cubic meter).

E9.4.5 Apply mathematical skills associated with calculation of pulpwood volume.

CRITERION-REFERENCED MEASURE

C9.4 Calculate the volume of pulpwood for either a written set of dimensions, the actual pulp sticks, or a standing tree. Calculations must be within ±5 percent of the instructor's calculations.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare case study data and have students calculate the volume of pulpwood for several written sets of dimensions (E9.4.1-E9.4.5).
2. Select pulp sticks or standing trees and have students calculate the volume of pulpwood (E9.4.1-E9.4.5).
3. Have students participate in local or regional competition, e.g., the federation FFA Forestry Contest (E9.4.1-E9.4.4).

SELECTED TOOLS AND MATERIALS

Case study data
Steel tape measure
Biltmore stock
Pulpwood or standing trees

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
National Forest Log Scaling Handbook, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

TASK/COMPETENCY

9.5 Estimate the volume of standing timber on a given tract

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

9.5

PERFORMANCE OBJECTIVE

P9.5 Given access to a tract of land, estimate the volume of standing timber for that particular tract. Estimations must be within ±5 percent of the instructor's calculations.

SELECTED ENABLING OBJECTIVES

E9.5.1 Define terminology associated with measuring standing timber.

E9.5.2 List tools used for measuring standing timber.

E9.5.3 Describe proper usage of each tool.

E9.5.4 Perform mathematical calculations necessary to calculate volume of timber.

E9.5.5 Explain the concept of random and stratified sampling as applied to estimations.

CRITERION-REFERENCED MEASURE

C9.5 Estimate the volume of standing timber on a particular tract. Estimations must be within ±5 percent of the instructor's calculations.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select a site containing several trees with varying diameters and heights (E9.5.1, E9.5.2).
2. Have students use the Biltmore stick, diameter tape, and tree caliper to measure diameter breast high (dbh) and compare accuracy of measurement obtained (E9.5.3).
3. Have students measure each tree and discuss whether the totals of these trees give an accurate estimation for the entire stand (E9.5.1-E9.5.5).

SELECTED TOOLS AND MATERIALS

Biltmore stick (with Merritt Hypsometer scale)
Diameter tape
Tree caliper

SELECTED AUDIOVISUAL MATERIALS

Slides: Timber Cruising, Ohio Agricultural Education Curriculum Materials Service.

SELECTED REFERENCES

Teaching Materials:
National Forest Log Scaling Handbook, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

TASK/COMPETENCY

9.6 Demonstrate knowledge of tree fertilization

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

9.6

PERFORMANCE OBJECTIVE

P9.6 Given resources on forest management, demonstrate knowledge of tree fertilization. A written plan should be developed on fertilization for an actual site or case study data prepared by the instructor, and plan must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E9.6.1 Determine need for additional fertilizer by reviewing common methods of diagnosis.

E9.6.2 Identify level of nutrients needed for young and older stands.

E9.6.3 Describe effects of nitrogen, phosphorus, and potassium, and other macro- and micro-nutrients upon tree growth.

E9.6.4 Identify methods used to time applications to coincide with plant growth cycles.

E9.6.5 Determine amount and method of application.

E9.6.6 Explain the cost/benefit factors associated with fertilization.

CRITERION-REFERENCED MEASURE

C9.6 Demonstrate knowledge of tree fertilization by preparing written plan for an actual site or case study data prepared by the instructor. Plan must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare case studies or select a site requiring possible fertilizer application (E9.6.1).

2. Have students research topic to deterine reasons for using a fertilizer (9.6.1).

3. Have students grow container plants and apply differing levels of fertilization (E9.6.3).

4. Invite a commercial forester to class to discuss the topic with the students (E9.6.3-E9.6.6).

5. Have students prepare written recommendations for review (E9.6.1-E9.6.6).

SELECTED TOOLS AND MATERIALS

Case studies about fertilization
Instructor-prepared checklist on tree fertilization

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

Principles of Silviculture. 2nd ed., pp. 430-434, Theodore Daniel, John Helms, and Frederick S. Baker.

Properties and Management of Forest Soils, pp. 328-390, William L. Pritchett.

CONTENT/CONCEPT

9. MANAGING THE FOREST

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

9.7 Identify regeneration techniques necessary for the continous growth of trees.

COURSE

Natural Resources Management V
(8044)

9.7

PERFORMANCE OBJECTIVE

P9.7 Given guidelines on managing the forest, identify regeneration techniques that are necessary for the continuous growth of trees. Acceptable performance will include listing and describing five regeneration techniques on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E9.7.1 List forest regeneration techniques.

E9.7.2 Identify appropriate usage for each regeneration technique.

E9.7.3 Describe procedures to be followed in implementing each regeneration technique.

E9.7.4 Define terminology associated with regeneration techniques.

CRITERION-REFERENCED MEASURE

C9.7 Identify regeneration techniques that are necessary for the continuous growth of trees. Acceptable performance will include listing and describing five regeneration techniques on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a field trip to visit several forest sites in need of regeneration techniques. Have students describe how to use a specific technique for each site (E9.7.1-E9.7.4).
2. Have students conduct regeneration techniques on several sites in the local community. The students' homesites could be used (P9.7).
3. Invite a professional forester to discuss regeneration techniques with the class (E9.7.1-E9.7.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared worksheet on regeneration techniques

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:

Principles of Silviculture, 2nd ed., pp. 371-415, Theodore Daniel, John Helms, and Frederick Baker.

Teaching Materials:

Equipment for Reforestation and Timber Stand Improvement, pp. 3 -160, USDA, Forest Service.

National Forest Landscape Management: Timber, USDA, Forest Service.

Seed and Planting Stock Dealers, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

TASK/COMPETENCY

9.8 Design plans to establish forest roads

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

9.8

PERFORMANCE OBJECTIVE

P9.8 Given resources on managing the forest, design plans to establish forest roads for hypothetical or actual situations developed by the instructor. Acceptable performance will be achieved by a satisfactory rating by the instructor on the criteria listed in C9.8 in the written plan.

SELECTED ENABLING OBJECTIVES

E9.8.1 Determine the need for and purpose of the road system.

E9.8.2 Determine the general location of the road.

E9.8.3 Identify the actual and visual impacts upon the environment from landforms, vegetation, and structures associated with the roadwork.

E9.8.4 Describe a possible layout for the roadbed by walking the length of the site.

E9.8.5 Conduct a preliminary location survey and mark road.

E9.8.6 Explain method used to clear merchantable trees in the right-of-way.

E9.8.7 Explain importance of providing drainage and slope stabilization.

E9.8.9 Identify procedure to prepare skid roads and skid trails needed to remove timber from stump site.

E9.8.10 Locate landings of appropriate size to accommodate equipment used.

E9.8.11 Explain methods to control erosion of soil surrounding logging and skid roads and at landings by seeding with grass or legumes or by using mulches.

E9.8.12 Define terminology associated with establishing forest roads.

E9.8.13 Apply mathematical skills associated with establishing forest roads.

CRITERION-REFERENCED MEASURE

C9.8 Design plans to establish forest roads for the hypothetical or actual situations developed by the instructor. An acceptable rating by the instructor should be achieved on written plan for each of the following criteria. The proposed road plan:

a. specifies location of road
b. lists equipment to be used
c. describes erosion control measures.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a field trip to examine local examples of good and poor forest roads (E9.8.1-E9.8.4).

2. Select a tract of timber to be harvested and have students design plans for establishing the roads needed for the harvesting operation (E9.8.1-E9.8.13).

3. Have students work with a local landowner to reclaim an overgrown or eroded forest road (E9.8.6-E9.8.11).

SELECTED TOOLS AND MATERIALS

Case study situations
Abney hand level or Suunto clinometer
Measuring tape
Flagging material
Axe or brushhook
Hand compass
Aerial photos or map
Grade and slope stakes (for permanent roads)
Road-building heavy equipment

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:

Handbook for Eastern Timber Harvesting, pp. 135-180, USDA, Forest Service.
National Forest Landscape Management: Roads, USDA, Forest Service.
National Forest Landscape Management: Timber, pp. 208-215, USDA, Forest Service.
Permanent Logging Roads for Better Woodlot Management, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

9.9 Develop a plan for the management of a forest

COURSE

Natural Resources Management V
(8044)

9.9

PERFORMANCE OBJECTIVE

P9.9 Given resources on managing the forest, develop a plan for the management of a forest. A written plan should be developed that contains the items listed in C9.9 and is acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E9.9.1 Identify major forest type appropriate to the region.

E9.9.2 Determine objectives of individual or firm owning the forest.

E9.9.3 Analyze current forest stand (composition, age, growth rate, size, etc.).

E9.9.4 Explain the need for intermediate and harvest cuts.

E9.9.5 Identify cultural practices to promote opitmal growth.

E9.9.6 Determine how to secure cost-efficient machinery, equipment, and tools.

E9.9.7 Explain procedure to prepare land for reforestation after harvesting.

E9.9.8 Define terminology associated with managing a forest.

E9.9.9 Apply mathematical skills associated with managing a forest.

CRITERION-REFERENCED MEASURE

C9.9 Develop a plan for the management of a forest. A written plan must be acceptable according to instructor-prepared checklist and contain the following items:

a. Type of dominant stand
b. Owner's wishes and goals
c. Description of current stand and projected growth patterns
d. Recommendations for cultural changes
e. Plan for implementing cultural practices, including costs and expected returns.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select a nearby woodlot and have students visit the site (E9.9.1-E9.9.4).
2. Have students interview owner to determine long-range desires and plans for the acreage (E9.9.2).
3. Have each student prepare written plans for managing the site and compare with recommendations of a professional forester (E9.9.1-E9.9.9).
4. If possible, have students carry out the management plans to determine costs involved (E9.9.6, E9.9.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on forest management

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, USDA, Forest Service.
Forest Management Chemicals: A Guide to Use when Considering Pesticides for Forest Management, USDA, Forest Service.
National Forest Landscape Management: Timber, USDA, Forest Service.
Planting and Care of Farm Forests, Vocational Agriculture Service.
Silvicultural Systems for the Major Forest Types of the United States, USDA, Forest Service.
Wilderness Manager's Handbook, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

TASK/COMPETENCY

9.10 Plan a timber stand improvement project of planting, thinning, and pruning a stand of uneven-aged or even-aged forests

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

9.10

PERFORMANCE OBJECTIVE

P9.10 Given resources on forest management, plan a timber stand improvement (TSI) project of planting, thinning, and pruning a stand of uneven-aged or even-aged forests. The plan must be in written form and must receive an acceptable rating according to instructor-provided checklist.

SELECTED ENABLING OBJECTIVES

E9.10.1 Define timber stand improvement (TSI), and other related terminology.

E9.10.2 Explain method used to prepare forest site for planting.

E9.10.3 Identify procedures used to seed or plant site.

E9.10.4 Identify procedures used to thin and prune site.

E9.10.5 Describe culling, fire, forest watershed, forest recreation, wildlife and fish production, and special forest products for sale and relate to TSI.

E9.10.6 Apply mathematical skills associated with planning a TSI project.

CRITERION-REFERENCED MEASURE

C9.10 Plan a timber stand improvement (TSI) project of planting, thinning, and pruning a stand of uneven-aged or even-aged forests. The plan must be in written form and must receive an acceptable rating according to instructor-provided checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select a local site that requires a timber stand improvement project for uneven-aged forests (E9.10.1-E9.10.6).
2. Have students examine site and inventory trees and growth rates (E9.10.1).
3. Have students prepare written recommendations for planting, thinning, and pruning site (E9.10.1-E9.10.6).
4. Invite a commercial forester to examine the site and prepare TSI recommendations (E9.10.1-E9.10.6).

SELECTED TOOLS AND MATERIALS

Pruning saws
Chain saw
Instructor-provided checklist on timber stand improvement

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Principles of Silviculture, 2nd ed., Theodore Daniel, John Helms, and Frederick Baker.

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, pp. 117-151, USDA, Forest Service.
Managing Young Stands for Firewood, USDA, Forest Service.
National Forest Landscape Management: Timber, USDA, Forest Service.
Why TSI? Timber Stand Improvement Increases Profits, USDA, Forest Service.

CONTENT/CONCEPT

9. MANAGING THE FOREST

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

9.11 Manage a forest harvesting plot

COURSE

Natural Resources Management V
(8044)

9.11

PERFORMANCE OBJECTIVE

P9.11 Given a simulated supervisory role, manage a forest harvesting plot in a role-play situation and play the supervisor for a specific period of time during a simulated harvesting operation. Successful performance will be an acceptable rating on activities listed in E9.11.1 through E9.11.11.

SELECTED ENABLING OBJECTIVES

E9.11.1 Select trees for harvest.

E9.11.2 Demonstrate ability to use roads and clearings to good advantage.

E9.11.3 Supervise felling of trees.

E9.11.4 Supervise limbing and bucking of trees.

E9.11.5 Supervise handling and skidding of trees.

E9.11.6 Supervise loading of logs and other material.

E9.11.7 Supervise hauling of logs and other material.

E9.11.8 Enforce safety regulations during harvesting operation.

E9.11.9 Define terminology associated with managing a forest harvesting plot.

E9.11.10 Apply mathematical skills associated with managing a forest harvesting plot.

E9.11.11 Maintain the necessary records of the plot and the harvesting operation.

CRITERION-REFERENCED MEASURE

C9.11 Manage a forest harvesting plot by assuming a supervisory role for a specific period of time in a role-play situation. Successful performance will be an acceptable rating of activities listed in E9.11.1 through E9.11.11.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss with students the supervisory duties needed to be performed in managing forest harvesting plot (E9.11.1-E9.11.11).
2. Have students observe a forest plot being harvested and note the duties performed by the supervisor (E9.11.1-E9.11.11).
3. Have a student shadow the supervisor for a period of time to determine other duties performed (E9.11.11).

SELECTED TOOLS AND MATERIALS

Measuring tools (increment borer, diameter tape, Biltmore stick)
Harvesting equipment (chain saw or power equipment)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Our Natural Resources, Harry B. Kircher and Donald L. Wallace.

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, pp. 193-237, USDA, Forest Service.
Forest Management Practices to Prevent Insect and Disease Damange to Southern Pine, USDA, Forest Service.
National Forest Landscape Management: Timber, USDA, Forest Service.
National Forest Log Scaling Handbook, USDA, Forest Service.
Uneven-Aged Silviculture and Management in the United States, USDA, Forest Service.

CONTENT/CONCEPT

10. CONTROLLING AND PREVENTING FOREST FIRES

TASKS/COMPETENCIES

10.1 Demonstrate knowledge of fire control measures

10.2 Describe the location of a forest fire, using Forest Service terminology

10.3 Write a control program for a fire

10.4 Conduct safety training exercises and demonstrate being responsible for others in fire control

10.5 Prepare publicity showing how people can prevent timber, forest, and grass fires

10.6 Lay out a plan on paper to mop up the fire after it is brought under control

10.7 Complete the Forest Service fire report

CONTENT/CONCEPT

10. CONTROLLING AND PREVENTING FOREST FIRES

TASK/COMPETENCY

10.1 Demonstrate knowledge of fire control measures

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

10.1

PERFORMANCE OBJECTIVE

P10.1 Given instructor-prepared test on controlling and preventing forest fires, including trash disposal, prescribed burning, and attack, demonstrate knowledge of fire control measures. Acceptable performance will be a score of 80 percent accuracy on test.

SELECTED ENABLING OBJECTIVES

E10.1.1 Recite the 10 standard fire fighting orders and explain each order.

E10.1.2 Diagram the chain of command for a fire fighting crew.

E10.1.3 Identify standards for passing a required physical fitness test before crew member assignments can start.

E10.1.4 Explain procedures to operate hand and/or power tools and equipment used by crew members.

E10.1.5 List potentially life-threatening/property-damaging situations dealing with fire control.

E10.1.6 Explain the fire triangle and how to control a fire by removing one or more legs of a triangle.

E10.1.7 Define terminology associated with fire control assignments.

CRITERION-REFERENCED MEASURE

C10.1 Demonstrate knowledge of fire control measures. Acceptable performance will be a score of 80 percent accuracy on instructor-prepared test.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure copies of 10 Standard Fire Fighting Orders and have each student complete this programmed text (E10.1.1).

2. Secure films depicting the role of a fire control crew member and have students discuss the films, especially noting safety precautions (E10.1.1-E10.1.7).

3. Invite a local forest service ranger to speak to the class and organize a Keep Virginia Green (KVG) fire fighting crew. Actual fire line construction should be undertaken by the students (E10.1.1-E10.1.7).

SELECTED TOOLS AND MATERIALS

Axe
Back pack pump
Brushhook
Chain saw
Crosscut saw
Fire brook
Hard hat
Pulaski
Rake
Shovel
Steel toe boots
Torch (fusee and drip)
Instructor-prepared test on fire control measures

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Introduction to Fire Behavior (2) Atmospheric Stability and Instability (3) Man Against Fire (4) Crew Boss (5) Fire Weather (6) Water on the Fire (7) Handtools for Wildfire (8) Standards for Survival (9) Your Way Out. Boise Interagency Fire Center (contact local forester for availability).

SELECTED REFERENCES

Teaching Materials:
Fire-Weather Observer's Handbook, USDA, Forest Service.
10 Standard Fire Fighting Orders, USDA, Forest Service.

Application

CONTENT/CONCEPT

10. CONTROLLING AND PREVENTING FOREST FIRES

TASK/COMPETENCY

10.2 Describe the location of a forest fire, using Forest Service terminology

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

10.2

PERFORMANCE OBJECTIVE

P10.2 Given instruction on controlling and preventing forest fires and a case-study situation, describe the location of a forest fire, using Forest Service terminology, with a 100 percent accuracy rate on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E10.2.1 Describe features on a contour map, including all symbols.

E10.2.2 Explain the system of forest fire location used in Virginia.

E10.2.3 Define and explain measurement units used by the Forest Service.

E10.2.4 Determine how to read and follow a compass.

E10.2.5 Identify north, east, west, and south on written materials and in the outdoors.

E10.2.6 Define terminology associated with forest fire location.

E10.2.7 Apply mathematical skills associated with forest fire location.

CRITERION-REFERENCED MEASURE

C10.2 Describe the location of a forest fire, using Forest Service terminology, in a case-study situation, with a 100 percent accuracy rate on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select a site for a hypothetical forest fire and mark the area with flagging. Have students determine the proper location of the proposed fire and compare their answers with the instructor's answer (E10.2.1-E10.2.7).

2. Invite a local forest fire warden to speak to the class and explain the procedures used to describe a forest fire location (E10.2.1-E10.2.7).

SELECTED TOOLS AND MATERIALS

Maps (topographic, grid, etc.)
Tape measure
Telephone
Case study situations
Instructor-prepared worksheet on locating forest fires

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Fire Behavior, (series of 11 units), Boise Interagency Fire Center.

Application

CONTENT/CONCEPT

10. CONTROLLING AND PREVENTING FOREST FIRES

TASK/COMPETENCY

10.3 Write a control program for a fire

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

10.3

PERFORMANCE OBJECTIVE

P10.3 Given a case study situation of a specific forest fire, write a plan to develop a control program for the fire. The written plan must include recommendations for all factors listed in C10.3 and must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E10.3.1 Describe three main parts of a fire environment and their interaction.

E10.3.2 List and describe characteristics of fire behavior.

E10.3.3 Describe primary fire management objectives and relate these to decisions affecting fire control plans.

E10.3.4 List various methods of fire control and tell when each method is used.

E10.3.5 Explain calculations and predictions used to determine a fire's potential behavior.

E10.3.6 Define terminology associated with fires and their control.

E10.3.7 Apply mathematical skills associated with fires and their control.

CRITERION-REFERENCED MEASURE

C10.3 Write a plan to develop a control program for a specific forest fire which includes recommendations for each of the following topics:

a. location of the control lines
b. standards for fire line construction
c. use of direct or indirect attack
d. limitations on use of forces
e. identification of hazardous fire conditions
f. timing of control actions.

This written plan must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure copies of the "Worksheet for Predicting Fire Behavior" found in Fire Behavior Field Guide. Have students complete the worksheet for a case study developed by the instructor (E10.3.1-E10.3.7).
2. Invite a Forest Service representative to discuss the topic of fire control plans with the class (E10.3.1-E10.3.7).

SELECTED TOOLS AND MATERIALS

Case study materials about forest fire(s)
Instructor-prepared checklist on fire control

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Fire Behavior, (series of 11 units), Boise Interagency Fire Center.

Application

CONTENT/CONCEPT
10. CONTROLLING AND PREVENTING FOREST FIRES

TASK/COMPETENCY
10.4 Conduct safety training exercises and demonstrate being responsible for others in fire control

PROGRAM
AGRICULTURAL RESOURCES (03.0101)

COURSE
Natural Resources Management V (8044)

10.4

PERFORMANCE OBJECTIVE
P10.4 Given resources and safety lessons on controlling and preventing forest fires, conduct safety training exercises and demonstrate being responsible for others in fire control. Successful performance will be determined by an acceptable rating on instructor-prepared checklist during safety training exercises.

SELECTED ENABLING OBJECTIVES
E10.4.1 Recite the 10 standard fire fighting orders and explain each order.

E10.4.2 Describe precautions to be observed during fire fighting.

E10.4.3 Identify characteristics of fires leading to fatalities.

E10.4.4 Explain the importance of effective communication during fire control.

E10.4.5 Demonstrate ability to use fire-fighting tools and equipment properly.

E10.4.6 Outline a series of lessons regarding safety during fire control.

E10.4.7 Define terminology associated with fire control safety.

CRITERION-REFERENCED MEASURE
C10.4 Conduct safety training exercises and demonstrate being responsible for others in fire control. Successful performance will be determined by an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have each student select the 10 standard fire fighting orders and prepare a presentation explaining the order to the class. The presentation could be a demonstration, role-play, illustrated lecture, simulation, or another method emphasizing class participation (E10.4.1).
2. Have students discuss the importance of communication in fire control situations (E10.4.4).
3. Have students present demonstrations showing the proper usage of fire-fighting tools and equipment (E10.4.5).
4. Explain safety precautions to be followed during fire fighting and have students discuss how fatalities may occur (E10.4.2-E10.4.3).
5. Introduce lessons and appropriate terminology associated with fire control and have students discuss (E10.4.6-E10.4.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on safety training

SELECTED AUDIOVISUAL MATERIALS

Hand Tools of the Fire Control Forester, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Fire Behavior, (series of 11 units), Boise Interagency Fire Center.
Health and Safety Code Handbook, USDA, Forest Service.
10 Standard Fire Fighting Orders, USDA, Forest Service.

CONTENT/CONCEPT

10. CONTROLLING AND PREVENTING FOREST FIRES

TASK/COMPETENCY

10.5 Prepare publicity showing how people can prevent timber, forest, and grass fires

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

10.5

PERFORMANCE OBJECTIVE

10.5 Given access to a booth at a local fair, prepare publicity showing how people can prevent timber, forest, and grass fires. Successful performance will be an acceptable rating on instructor-prepared checklist of all criteria listed in C10.5.

SELECTED ENABLING OBJECTIVES

E10.5.1 Describe the Virginia forest fire and burning laws.

E10.5.2 Illustrate methods of fire prevention.

E10.5.3 Describe Forest Service symbols used in fire prevention publicity.

E10.5.4 Select an appropriate format for the publicity release.

E10.5.5 Explain restrictions involved in using the "Smokey the Bear" emblem.

CRITERION-REFERENCED MEASURE

C10.5 Prepare publicity showing how people can prevent timber, forest, and grass fires using the following criteria. The publicity should receive an acceptable rating on instructor-prepared checklist of the following criteria:

a. contained appropriate content for a specific audience
b. employed principles effectively for visual materials; employed principles of communication for audio materials
c. made effective use of local data and information
d. reached the intended target audience.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a poster contest within the class and have the art teacher examine the posters and provide suggestions. The posters could then be displayed in the local community (E10.5.1-E10.5.5).

2. Have students prepare publicity for release during Fire Prevention Week, e.g., flyers, posters, radio spots, etc. (E10.5.1-E10.5.5).

3. Have the FFA chapter sponsor a poster or essay contest at a local junior high or elementary school on the topic of fire prevention (P10.5).

SELECTED TOOLS AND MATERIALS

Tape recorder
Smokey the Bear materials
Instructor-prepared checklist on publicity

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Activities for Learning About Conservation of Forest Resources. A Guide for Leaders of Youth Groups, USDA, Forest Service.
The Natural Role of Fire, USDA, Forest Service.
You and Forest Fires, USDA, Forest Service.

CONTENT/CONCEPT

10. CONTROLLING AND PREVENTING FOREST FIRES

TASK/COMPETENCY

10.6 Lay out a plan on paper to mop up the fire after it is brought under control

PROGRAM

AGRICULTURAL EDUCATION (03.0101)

COURSE

Postsecondary

10.6

PERFORMANCE OBJECTIVE

P10.6 Given resources on controlling and preventing forest fires, lay out a plan on paper to mop up the fire after it is brought under control. Acceptable performance will include developing a plan meeting with an acceptable rating of all criteria in C10.6, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E10.6.1 Determine location of fire and total area to be mopped up.

E10.6.2 Assess resources needed to mop up the area of the fire.

E10.6.3 Identify available resources that can be committed to this activity.

E10.6.4 Set schedule and procedure for work crews to follow.

E10.6.5 Explain need for revegetation or reforestation of burned area.

E10.6.6 Apply mathematical skills associated with a mop-up plan.

CRITERION-REFERENCED MEASURE

C10.6 Lay out a plan on paper to mop up a forest fire after it is brought under control. Acceptable performance will include developing a plan meeting with an acceptable rating of all criteria that follows, according to instructor-prepared checklist.

a. location of fire
b. resources needed for mop up:
    1. labor
    2. equipment
    3. supplies
c. schedule and procedures for work crews
d. plan for revegetation or reforestation.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit a recent forest fire site to assess the need for mop-up. Invite a forester to accompany the class and explain how the area could be restored to a productive state (E10.6.1-E10.6.6).

2. Arrange to have students work with the owner of land that has been burned over. The students can be responsible for developing a plan for mop-up and restoration (E10.6.1-E10.6.6).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on fire mop-up

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Fire Behavior, (series of 11 units), Boise Interagency Fire Center.

Application

CONTENT/CONCEPT

10.7 CONTROLLING AND PREVENTING FOREST FIRES

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

10.7 Complete the Forest Service fire report

COURSE

Postsecondary

10.7

PERFORMANCE OBJECTIVE

P10.7 Given appropriate guidelines and reporting forms, complete the Forest Service fire report, including investigating the cause of fires, collecting evidence from trespassers, and gathering information needed for fire reports. Acceptable performance will be the completion of the Forest Service fire report with 100 percent accuracy according to instructor's written guidelines.

SELECTED ENABLING OBJECTIVES

E10.7.1 List the primary causes of fire.

E10.7.2 List the legal restrictions of a Forest Service official in investigating and obtaining information.

E10.7.3 Identify accepted procedures in investigating fires.

E10.7.4 Complete a fire report form for a given situation.

E10.7.5 Define terminology associated with completing fire reports.

CRITERION-REFERENCED MEASURE

C10.7 Complete the Forest Service fire report, including investigating the cause of fires, collecting evidence from trespassers, and gathering information needed for fire reports. Acceptable performance will be the completion of the Forest Service fire report with 100 percent accuracy according to instructor's written guidelines.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss the causes of fires, particularly forest fires (E10.7.1).
2. Describe the role of a fire investigator (E10.7.2).
3. Invite a local arson investigator to discuss his or her work with the class (E10.7.3).
4. Discuss the completion of a Forest Service fire report with the class and have students complete the form for a given situation (E10.7.4-E10.7.5).

SELECTED TOOLS AND MATERIALS

Fire report form
Instructor-prepared guidelines on reporting

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Fire Behavior, (series of 11 units), Boise Interagency Fire Center.

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASKS/COMPETENCIES

11.1 Locate markets for forest products

11.2 Remove debris from work area

11.3 Select timber for purchase

11.4 Plan logging activities

11.5 Analyze the purchase of equipment

11.6 Outline the procedure for supervising the loading of logs

11.7 Outline the procedure for supervising the unloading of logs

11.8 Develop a plan to deliver forest products to manufacturing sites

11.9 Demonstrate ability to fell trees according to cutting patterns, using chain saw

11.10 Demonstrate ability to limb and top felled trees

11.11 Make bucking cuts

11.12 Outline procedures for managing harvesting operations

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.1 Locate markets for forest products

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

11.1

PERFORMANCE OBJECTIVE

P11.1 Given guidelines on marketing forest products, locate markets for specific forest products by completing instructor-prepared worksheet. The instructor must agree that the market chosen is the most profitable market, and a score of 80 percent accuracy must be achieved according to guidelines.

SELECTED ENABLING OBJECTIVES

E11.1.1 Identify the markets for logs and pulpwood within the county and adjacent counties.

E11.1.2 Determine type of forest product accepted by each market, including species, grade, minimum diameters, lengths, trim allowance, or other criteria.

E11.1.3 Determine market demand and the impact of a new supplier.

E11.1.4 Determine the price paid by each market for a product.

E11.1.5 State the special conditions that must be considered in order to deliver a product to a particular market. (This could include harvesting, transporting, or product quality considerations.)

E11.1.6 Select the most profitable market and defend answer.

E11.1.7 Define terminology associated with locating a market for forest products.

E11.1.8 Apply mathematical skills associated with locating a market for forest products.

CRITERION-REFERENCED MEASURE

C11.1 Locate markets for specific forest products by completing instructor-prepared worksheet. The instructor must agree that the market chosen is the most profitable market, and a score of 80 percent accuracy must be achieved according to guidelines.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine yellow pages of telephone directories to determine markets for logs and pulpwood (E11.1.1).

2. Have students contact each market to determine type of forest product accepted, market demand, prices paid, special conditions (E11.1.2-E11.1.5).

3. Develop case study situation and have students determine the most profitable market (E11.1.6).

4. Invite a buyer from a local market to discuss this topic with the class (E11.1.1-E11.1.8).

SELECTED TOOLS AND MATERIALS

Telephone directories
Instructor-prepared guidelines on locating forest markets
Instructor-prepared worksheet on forest markets

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Wood Handbook: Wood as an Engineering Material, USDA, Forest Service.

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.2 Remove debris from work area

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

11.2

PERFORMANCE OBJECTIVE

P11.2 Given access to an appropriate work location or a simulated situation, remove all debris from work area that might impede free movement of labor and machinery during the harvesting and transporting phases of work. All debris must be removed from work area in order to have free movement of labor and machinery, and an acceptable rating must be achieved on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E11.2.1 Clear working space around butt of tree.

E11.2.2 Prepare a getaway path for use when tree is felled.

E11.2.3 Remove brush, low hanging limbs, or debris interfering with saw cut.

E11.2.4 Clip brush or saplings with axe.

E11.2.5 Devise plan to remove or dispose of debris after harvest.

E11.2.6 Obtain equipment for removing debris.

E11.2.7 Clean work area of debris such as empty containers, refuse or equipment servicing spills.

E11.2.8 Place debris in suitable location for disposal.

E11.2.9 Perform final clean-up when leaving work area, especially removing visual eyesores.

CRITERION-REFERENCED MEASURE

C11.2 Remove all debris from work area that might impede free movement of labor and machinery during the harvesting and transporting phases of work. An acceptable rating must be achieved on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss and then perform the task of removing debris from the work area (E11.2.1-E11.2.9).
2. Conduct a role play illustrating the importance of removing debris from the work area. Be especially careful not to cause a real accident during the role play (E11.2.1-E11.2.9).
3. Have students develop a bulletin board or poster depicting the importance of performing this activity (E11.2.1-E11.2.9).

SELECTED TOOLS AND MATERIALS

Axe
Instructor-prepared checklist on debris removal

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, pp. 7-78, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, p. 25, USDA, Forest Service.

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.3 Select timber for purchase

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

11.3

PERFORMANCE OBJECTIVE

P11.3 Given appropriate information regarding forest sites, select the most profitable tract of timber for purchase from among three sites. The choice must agree with the instructor's selection and must be based on the criteria listed in C11.3.

SELECTED ENABLING OBJECTIVES

E11.3.1 Locate pertinent forest inventory information for the locality.

E11.3.2 Explain procedure to follow in examining timber stands, giving special attention to timber type and markets available.

E11.3.3 Determine fair market value for the owner of each tract.

E11.3.4 Identify special problems, such as, topography, accessibility to public roads, road construction costs, or unusual transportation costs for each tract.

E11.3.5 Define terminology associated with selecting timber for purchase.

E11.3.6 Apply mathematical skills associated with selecting timber for purchase.

CRITERION-REFERENCED MEASURE

C11.3 Select the most profitable tract of timber for purchase from among three sites. The choice must agree with the instructor's selection and be based on the "following" criteria:

a. examination of pertinent forest inventory information
b. examination of timber stands by on-site visitation to determine present marketing potential and special problems associated with each tract
c. examination of unusual harvesting or transportation costs or restrictions given by the owner.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine maps or other descriptions of the pertinent areas (E11.3.1).
2. Select three sites that possess different timber characteristics and have students physically examine the sites to determine timber condition and harvesting considerations (E11.3.1-E11.3.6).
3. Have students cruise a timber stand and mark merchantable sawlogs suitable for harvest (E11.3.2).

SELECTED TOOLS AND MATERIALS

Forest inventory information

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:

Forest Management Evaluation in Virginia, VPI&SU, Extension Division.
Hardwood Log Grades and Lumber Yields for Factory Lumber Yards, USDA, Forest Service.
How to Predict Lumber-Grade Yields for Graded Trees, USDA, Forest Service.
National Forest Landscape Management: Timber, pp. 65-185, USDA, Forest Service.
National Forest Log Scaling Handbook, USDA, Forest Service.
Timber Harvesting Occupations, V-TECS.

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.4 Plan logging activities

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

11.4

PERFORMANCE OBJECTIVE

P11.4 Given access to a suitable forest site or a simulated situation, plan logging activities for a specific plot of timber for a time frame specified by the instructor. The plan must include all criteria listed in C11.4 and be judged acceptable on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E11.4.1 Explain procedure to follow in examining site of timber and determine size and location of harvesting tracts.

E11.4.2 Develop time schedule for harvesting based on rough market and weather considerations.

E11.4.3 Outline the logging activities, including (a) locating markets, (b) constructing roads and landing, (c) scheduling equipment, (d) estimating completion date for harvesting, and (e) estimating completion date for clean-up activities.

E11.4.4 Project cash flows required by the logging activity.

E11.4.5 Devise alternative schedules to determine impact upon performance or profit.

E11.4.6 Define terminology associated with planning of logging activities.

E11.4.7 Apply mathematical skills associated with planning of logging activities.

CRITERION-REFERENCED MEASURE

C11.4 Plan logging activities for a specific plot of timber and for a time period specified by the instructor. The plan must include the following criteria and be judged acceptable on instructor-prepared checklist:

a. rough sketch drawing showing harvesting tracts
b. time schedule
c. outline of logging activities
d. cash flow statement
e. alternative schedule(s) (optional).

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a case study using an actual plot of timber found in the local community. Provide information about available labor and equipment as well as market information. Have each student prepare a plan for logging activities that includes the criteria found in C11.4 (E11.4.1-E11.4.7).

2. Have a local logger visit the site and give recommendations for a plan of logging activities. Compare recommendations of logger with student plans (E11.4.1-E11.4.6).

3. Discuss logging activities, including the locating markets, constructing roads and landing, scheduling equipment, estimating completion date for harvesting, and estimating completion date for clean-up activities (E11.4.2-E11.4.3).

SELECTED TOOLS AND MATERIALS

Case study situations
Instructor-prepared checklist on logging activities

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: The Chain Saw and Other Harvesting Tools, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Determining Fixed and Operating Costs of Logging Equipment, USDA, Forest Service.
Equipment for Reforestation and Timber Stand Improvement, pp. 193-238, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, USDA, Forest Service.
Logging Systems Guide, USDA, Forest Service.
National Forest Landscape Management: Timber, pp. 196-220, USDA, Forest Service.
National Forest Log Scaling Handbook, USDA, Forest Service.

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

11.5 Analyze the purchase of equipment

COURSE

Natural Resources Management V
(8044)

11.5

PERFORMANCE OBJECTIVE

P11.5 Given a case study involving a timber harvesting operation, analyze the purchase of equipment needed for timber harvesting operations in a written plan. The plan must address all criteria listed in C11.5 and be approved by the instructor according to checklist.

SELECTED ENABLING OBJECTIVES

E11.5.1 Determine the job demands for a specified piece of equipment.

E11.5.2 Compute ownership and operating costs for the equipment.

E11.5.3 Identify savings and other advantages, as well as disadvantages resulting from the purchase.

E11.5.4 Examine the impact of purchase on cash flow of the operation.

E11.5.5 Explain how to locate dealers for equipment meeting the specified job demands.

E11.5.6 Determine local or regional parts and service availability.

E11.5.7 Determine financing option that best meets the needs of the operation.

E11.5.8 Explain process of ordering equipment, specifying manufacture of basic package and options.

E11.5.9 Determine arrangements for payment of purchase, including a repayment schedule for financing, if necessary.

E11.5.10 Apply mathematical skills associated with purchasing equipment.

CRITERION-REFERENCED MEASURE

C11.5 Analyze the purchase of equipment needed for timber harvesting operations in a written plan which is approved by the instructor and includes the following criteria:

a. need for specified piece of equipment
b. purchase cost
c. capability of equipment, including servicing requirements
d. restrictions to be overcome, e.g., operator training
e. size, type, and service availability
f. financial justification.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare written descriptions of the job demands for a piece of equipment and translate these demands into written specifications for the piece of equipment (E11.5.1).
2. Assign students to contact local equipment dealers and ask them to provide literature regarding their equipment (E11.5.5-E11.5.7).
3. Invite a local logger to the class to discuss the purchase of equipment and the decision-making process involved in deciding whether to purchase (E11.5.1-E11.5.10).

SELECTED TOOLS AND MATERIALS

Case study situations
Instructor-prepared checklist on purchasing equipment

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Determining Fixed and Operating Costs of Logging Equipment, USDA, Forest Service.
Equipment for Reforestation and Timber Stand Improvement, pp. 193-238, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, pp. 63-128, USDA, Forest Service.
Literature from equipment manufacturers.

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.6 Outline the procedure for supervising the loading of logs

PROGRAM

AGRICULTURAL RESOURCESS
(03.0101)

COURSE

Natural Resources Management V
(8044)

11.6

PERFORMANCE OBJECTIVE

P11.6 Given a case-study situation involving a loading crew and truck, outline the procedure for supervising the loading of logs, including maintaining good balance with no slippage and remaining within legal load limits. Performance must be 100 percent accurate on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E11.6.1 Explain importance of having a clear work area surrounding loading site.

E11.6.2 List process used to inspect loading equipment before starting to load logs.

E11.6.3 Identify procedure to follow for loading in a safe and efficient manner.

E11.6.4 Explain procedure used to examine truck and truck axles to determine if load is balanced.

E11.6.5 Describe how to attach chains and load binders correctly.

E11.6.6 Determine legal load limits for truck and route to be followed.

E11.6.7 Describe process of estimating weight of vehicle to determine if load is within legal weight limits.

E11.6.8 Explain OSHA safety standards for loading logs.

CRITERION-REFERENCED MEASURE

C11.6 Outline the procedure for supervising the loading of logs, including maintaining good balance with no slippage, and remaining within legal load limits, with 100 percent accuracy on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students view the loading of logs under field conditions and discuss the procedures and safety precautions used (E11.6.1-E11.6.8).
2. Have each student supervise the loading of logs by a loading crew, if possible. The instructor must remain nearby to oversee the operation (E11.6.1-E11.6.8).
3. Have students perform the hand signals used while loading logs (E11.6.3).

SELECTED TOOLS AND MATERIALS

Case study situation
Instructor-prepared worksheet on the loading of logs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Handbook for Eastern Timber Harvesting, pp. 99-120, USDA, Forest Service.

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.7 Outline the procedure for supervising the unloading of logs

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

11.7

PERFORMANCE OBJECTIVE

P11.7 Given a case-study situation involving an unloading crew and truck, outline the procedure for supervising the unloading of logs in a safe, efficient manner, following OSHA standards. Performance must be 100 percent accurate on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E11.7.1 Explain necessity of posting signs designating the unloading area.

E11.7.2 Describe process used to release, remove, and store load binders.

E11.7.3 List uses of loader to stabilize load before tripping stakes.

E11.7.4 Identify reasons for tripping stakes from safe position.

E11.7.5 Explain how to unload vehicle in safe, efficient manner for loader supplied.

E11.7.6 Explain use of hand signals to inform others of intentions.

E11.7.7 Explain how to reset stakes, move truck, remove debris from bed.

E11.7.8 Identify current OSHA standards when unloading logs.

CRITERION-REFERENCED MEASURE

C11.7 Outline the procedure for supervising the unloading of logs in a safe, efficient manner, following OSHA standards, with a 100 percent accuracy rate on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students view the unloading of logs at the unloading site and discuss the procedures and safety precautions used (E11.7.1-E11.7.8).

2. Have each student supervise the unloading of logs, if possible. The instructor must remain nearby to oversee the operation (E11.7.1-E11.7.8).

3. Have students perform the hand signals used while unloading logs (E11.7.6).

SELECTED TOOLS AND MATERIALS

Case study situation
Instructor-prepared checklist on the unloading of logs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Handbook for Eastern Timber Harvesting, USDA, Forest Service.

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

11.8 Develop a plan to deliver forest products to manufacturing sites

COURSE

Natural Resources Management V
(8044)

11.8

PERFORMANCE OBJECTIVE

P11.8 Given road maps and information on forest products, develop a plan to deliver forest products to manufacturing sites, using a profitable delivery route, maintaining an appropriate schedule, and complying with all Division of Motor Vehicle's laws. The written plan must contain a complete delivery schedule and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E11.8.1 Determine a profitable delivery route and an appropriate schedule for delivery.

E11.8.2 Identify how to examine load to determine compliance with length, width, height, and weight restrictions.

E11.8.3 Explain how to reexamine load and vehicle for safety hazards before entering a public highway.

E11.8.4 Identify how to operate vehicle in a safe, efficient manner and list all traffic regulations.

E11.8.5 Explain scaling or weighing process.

E11.8.6 Identify process followed after unloading to secure chains and binders, weigh out if needed, and prepare vehicle for return trip.

CRITERION-REFERENCED MEASURE

C11.8 Develop a plan to deliver forest products to manufacturing sites that contains a complete delivery schedule and is judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide students with case study information necessary to select the "most" profitable delivery route (E11.8.1).
2. Have students develop a checklist for motor vehicle operation. If possible, have students make or accompany a delivery and complete the checklist and give to the driver to stimulate better driving performance (E11.8.2-E11.8.6).

SELECTED TOOLS AND MATERIALS

Road maps
Case study situation
Instructor-prepared checklist on delivering forest products

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Handbook for Eastern Timber Harvesting, pp. 109-120, USDA, Forest Service.
Maps.

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.9 Demonstrate ability to fell trees according to cutting patterns, using chain saw

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

11.9

PERFORMANCE OBJECTIVE

P11.9 Given access to an appropriate site, demonstrate ability to fell trees according to cutting patterns, using a chain saw. At least three trees should be felled in the determined direction without kick back or lodging,

SELECTED ENABLING OBJECTIVES

E11.9.1 Determine exactly where tree should be dropped.

E11.9.2 Examine felling site for widow makers and possible lodging.

E11.9.3 Describe the location of skid trails and an escape route while felling trees.

E11.9.4 Determine whether trees should be felled away from or toward the skid trail.

E11.9.5 Demonstrate ability to make the undercut at the proper height with the chain saw.

E11.9.6 Demonstrate ability to make the backcut at the proper height with the chain saw.

E11.9.7 Use wedges as needed to cause tree to fall.

E11.9.8 Use special techniques and safety practices necessary for leaning, rotten, or lodged trees.

E11.9.9 Follow OSHA standards for operating a chain saw.

E11.9.10 Define terminology associated with felling trees.

CRITERION-REFERENCED MEASURE

C11.9 Fell trees according to cutting patterns, using a chain saw. Three trees should be felled without kick back or lodging and felled in the determined direction.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Present a demonstration to the students on felling trees. Have students identify and discuss the safety measures used in felling trees (E11.9.1-E11.9.10).

2. Have students orally describe the process they will follow in felling a particular tree. Have them make marks on the tree to show the saw cuts to be made and to describe their escape route (E11.9.1-E11.9.10).

3. Have students fell trees and discuss their performance, including describing their emotions during the process (E11.9.1-E11.9.10).

SELECTED TOOLS AND MATERIALS

Chain saw
Wedges

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: The Chain Saw and Other Harvesting Tools, Vocational Education Productions.

SELECTED REFERENCES

Books:
Professional Timber Felling: A Procedural Approach, D. Douglas Dent.

Teaching Materials:
Handbook for Eastern Timber Harvesting, pp. 23-35, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

TASK/COMPETENCY

11.10 Demonstrate ability to limb and top felled trees

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

11.10

PERFORMANCE OBJECTIVE

P11.10 Given access to an appropriate site, demonstrate process to limb and top felled trees. Cuts must be made flush with the trunk, caution must be exercised with limbs under stress, and procedure followed must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E11.10.1 Remove limbs from base to top of tree.

E11.10.2 Cut away from self on the opposite side of the stem.

E11.10.3 Make cut flush with the stem of the tree.

E11.10.4 Top tree at proper location.

E11.10.5 Describe mechanical devices used for limbing softwoods.

E11.10.6 Follow state laws or landowner's directions for limb disposal.

E11.10.7 Follow safe procedures when removing limbs under stress.

E11.10.8 Define terminology associated with limbing and topping felled trees.

CRITERION-REFERENCED MEASURE

C11.10 Limb and top felled trees by making cuts flush with the trunk, exercising caution with limbs under stress, and receive an acceptable rating on the process according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Present a demonstration to the students on limbing and topping felled trees. Have students recognize and discuss the safety measures used during this operation (E11.10.1-E11.10.8).

2. Have students orally describe the process they will follow in limbing and topping a particular tree. Have them make marks on the tree to show the saw cuts to be made (E11.10.1-E11.10.8).

3. Have students limb and top trees and discuss their performance (E11.10.1-E11.10.8).

SELECTED TOOLS AND MATERIALS

Chain saw
Hammer
Wedges
Instructor-prepared checklist on limbing and topping felled trees

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: The Chain Saw and Other Harvesting Tools, Vocational Education Productions.

SELECTED REFERENCES

Books:
Professional Timber Felling: A Procedural Approach, D. Douglas Dent.

Teaching Materials:
Handbook for Eastern Timber Harvesting, pp. 37-45, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.

Application

CONTENT/CONCEPT

11. HARVESTING FOEST PRODUCTS

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

11.11 Make bucking cuts

COURSE

Natural Resources Management V
(8044)

11.11

PERFORMANCE OBJECTIVE

P11.11 Given access to a suitable location for harvesting forest products, make bucking cuts on at least three trees. The bucking cuts must be made on the markings that appear on each tree and cuts must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E11.11.1 Explain relationship of bucking procedures to products to be delivered, their value, and the specifications of the purchaser.

E11.11.2 Size tree stem and mark to lengths for bucking cuts suitable for local markets.

E11.11.3 Demonstrate ability to use procedures to obtain maximum volume of high grade logs.

E11.11.4 Make bucking cuts in a safe manner, using a wedge if needed to prevent binding.

E11.11.5 Follow OSHA standards for operating a chain saw.

E11.11.6 Define terminology associated with making a bucking cut.

E11.11.7 Apply mathematical skills associated with making a bucking cut.

CRITERION-REFERENCED MEASURE

C11.11 Make bucking cuts on the tree markings found on each tree. At least three trees should be bucked and must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Present a demonstration to the students on bucking felled trees. Have students recognize and discuss the safety measures used during this operation (E11.11.1-E11.11.6).
2. Have students orally describe the process they will follow in making bucking cuts. Have them make marks on the tree to show the saw cuts to be made (E11.11.1-E11.11.7).
3. Have students make bucking cuts and discuss their performance (E11.11.1-E11.11.7).

SELECTED TOOLS AND MATERIALS

Chain saw
Wedges
Instructor-prepared checklist on bucking cuts

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Professional Timber Felling: A Procedural Approach, D. Douglas Dent.

Teaching Materials:
Handbook for Eastern Timber Harvesting, pp. 40-43, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.

Application

CONTENT/CONCEPT

11. HARVESTING FOREST PRODUCTS

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

11.12 Outline procedures for managing harvesting operations

COURSE

Postsecondary

11.12

PERFORMANCE OBJECTIVE

P11.12 Given resources on harvesting forest products, outline procedures for managing the harvesting operations. A written plan should be prepared describing the operation and must include the elements listed in C11.12 with 100 percent accuracy.

SELECTED ENABLING OBJECTIVES

E11.12.1 Identify type of cutting to be performed (intermediate vs. harvest).

E11.12.2 Prepare listing of equipment available by each operation to be performed and a projected time table.

E11.12.3 Determine felling patterns to be used.

E11.12.4 Identify elements required to supervise work crews as needed to expedite felling, limbing and bucking, skidding, loading and hauling operations.

E11.12.5 Prepare records needed for owner or agency.

E11.12.6 Define terminology associated with harvesting operations.

E11.12.7 Apply mathematical skills associated with harvesting operations.

CRITERION-REFERENCED MEASURE

C11.12 Outline procedures for managing forest harvesting operations by preparing a written plan that includes the following elements with 100 percent accuracy:

a. estimate of total scope of harvesting operation
b. summary of equipment available and labor available or required
c. listing of operations to be performed and a time schedule for completion of the entire job
d. description of typical supervisory duties while managing a harvesting operation

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students observe a local harvesting operation and prepare a list of all the processes that must be performed (E11.12.1-E11.12.7).

2. Have students interview the supervisor of harvesting operations to determine job responsibilities (E11.12.4, E11.12.5).

3. Organize students in conducting a small-scale harvesting operation and prepare written plans before and after the undertaking. Allow students to compare the two plans and determine what they had learned from their experiences (E11.12.1-E11.12.7).

SELECTED TOOLS AND MATERIALS

None identified

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:

Determining Fixed and Operating Costs of Logging Equipment, USDA, Forest Service.
Equipment for Reforestation and Timber Stand Improvement, pp. 193-237, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, USDA, Forest Service.
National Forest Landscape Management: Timber, USDA, Forest Service.
National Forest Log Scaling Handbook, USDA Forest Service.

CONTENT/CONCEPT

12. SAWING LOGS INTO LUMBER

TASKS/COMPETENCIES

12.1 Demonstrate sawmill safety, including first-aid treatment

12.2 Demonstrate ability to perform general operation activities

12.3 Demonstrate ability to operate carriage

12.4 Grade a stack of lumber

12.5 Demonstrate ability to operate circular saw

CONTENT/CONCEPT

12. SAWING LOGS INTO LUMBER

TASK/COMPETENCY

12.1 Demonstrate sawmill safety, including first-aid treatment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

12.1

PERFORMANCE OBJECTIVE

P12.1 Given guidelines on sawmill operation, practice sawmill safety, including administering first-aid treatment for routine situations, at all times. Evaluation will take place on a continuous basis and successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E12.1.1 Protect eyes and ears while at the sawmill site.

E12.1.2 Describe appropriate methods to handle materials safely.

E12.1.3 Dress in clothing that is suitable for each operation in which engaged.

E12.1.4 Wear safety equipment (personal protective devices) at all times.

E12.1.5 Remove dangerous materials from work site.

E12.1.6 Perform routine first aid treatments.

E12.1.7 Give signals when workers are to vacate an area.

CRITERION-REFERENCED MEASURE

C12.1 Practice sawmill safety, including administering first-aid treatment for routine situations at all times. Evaluation will take place on a continuous basis and successful peformance will be an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Arrange for students to observe local sawmill operation and compile a list of safety regulations in force (E12.1.1-E12.1.7).

2. Review the accident reports from the sawmill industry to determine possible causes of accidents (E12.1.1-E12.1.5).

3. Invite an industrial-site nurse to speak to the class about situations that may be encountered and how one should react (E12.1.6, E12.1.7).

SELECTED TOOLS AND MATERIALS

First-aid kit
Red Cross first-aid training films
Safety equipment (personal protective devices)
Instructor-prepared guidelines on sawmill safety
Instructor-prepared checklist on sawmill safety

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:

National Ag Occupations Competency Study: National Study for Identifying and Validating Essential Agricultural Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations, Government Printing Office.

Application

CONTENT/CONCEPT

12. SAWING LOGS INTO LUMBER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

12.2 Demonstrate ability to perform general operation activities

COURSE

Postsecondary

12.2

PERFORMANCE OBJECTIVE

P12.2 Given guidelines on sawmill operation, demonstrate ability to perform general operation activities. An acceptable rating should be achieved on an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E12.2.1 Check sources of power for operation.

E12.2.2 Identify methods for maintaining proper working condition of machinery.

E12.2.3 Identify methods for maintaining proper working condition of power system.

E12.2.4 Explain the function of all mobile equipment.

E12.2.5 Identify the location of all fire extinguishers.

E12.2.6 Identify the location of all fire hoses.

E12.2.7 Check fire extinguishers and determine workability.

CRITERION-REFERENCED MEASURE

C12.2 Demonstrate ability to perform general operation activities. An acceptable rating should be achieved on an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Visit a local sawmill and develop a list of general duties that must be performed (E12.2.1-E12.2.7).
2. Have sawyer relate the consequences of not performing routine maintenance operations (E12.2.2, E12.2.3).
3. Have students role play the performance of general operations and evaluate using a checksheet (P12.2).

SELECTED TOOLS AND MATERIALS

Hand tool assortment
Operator's manuals
Instructor-prepared checklist on operation activities

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
National Ag Occupations Competency Study: National Study for Identifying and Validating Essential Agricultural Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations, Government Printing Office.

CONTENT/CONCEPT

12. SAWING LOGS INTO LUMBER

TASK/COMPETENCY

12.3 Demonstrate ability to operate carriage

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

12.3

PERFORMANCE OBJECTIVE

P12.3 Given appropriate operating instructions, demonstrate ability to operate the carriage. The instructor will observe and correct any operational problems, and successful performance will be an acceptable score on instructor-prepared checklist of operation procedure.

SELECTED ENABLING OBJECTIVES

E12.3.1	Demonstrate knowledge of distance and space.
E12.3.2	Ride short distances backwards and forwards when necessary.
E12.3.3	Check rollers and coasters.
E12.3.4	Check bearings and fittings.
E12.3.5	Check feeding system.
E12.3.6	Conduct safety check of work area.

CRITERION-REFERENCED MEASURE

C12.3 Demonstrate ability to operate the carriage. The instructor will observe and correct any operational problems, and successful performance will be an acceptable score on instructor-prepared checklist of procedure.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students observe and discuss the operation of the carriage (E12.3.1-E12.3.6).
2. Review the safety rules to be considered in carriage operation (E12.3.6).
3. Under instructor supervision, have each student operate the carriage (E12.3.1-E12.3.6).

SELECTED TOOLS AND MATERIALS

Sawmill carriage
Instructor-prepared checklist on operating carriage

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:

Circular Sawmills and Their Efficient Operation, USDA, Forest Service.
National Ag Occupations Competency Study: National Study for Identifying and Validating Essential Agricultural Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations, Government Printing Office.

CONTENT/CONCEPT

12. SAWING LOGS INTO LUMBER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

12.4 Grade a stack of lumber

COURSE

Postsecondary

12.4

PERFORMANCE OBJECTIVE

P12.4 Given resources on lumber classification and grading, grade a stack of lumber. Six boards of known grades should be classified and fully identified, and instructor's grading must agree with student's on all boards.

SELECTED ENABLING OBJECTIVES

E12.4.1 Identify a board as hardwood or softwood.

E12.4.2 Apply grading rules of National Hardwood Lumber Association.

E12.4.3 Grade softwood lumber using the grading rules for the particular species.

E12.4.4 Identify method of using a prescribed procedure to evaluate each board in order to assign grade.

E12.4.5 Define terminology associated with grading lumber.

CRITERION-REFERENCED MEASURE

C12.4 Grade a stack of lumber. Six boards of known grades should be classified and fully identified, and instructor's grading must agree with student's on all boards.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students contact various hardwood and softwood grading associations for copies of grading rules (E12.4.2, E12.4.3).
2. Secure examples of differing grades of hardwood and softwood boards for student practice (E12.4.1-E12.4.5).
3. Have a lumber grader perform the work for the class to demonstrate the speed with which grading may be done (E12.4.4).

SELECTED TOOLS AND MATERIALS

Tape measure or grader's rule
Lumber for grading
Grading rules of National Hardwood Lumber Association

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Woodworking Technology, James J. Hammond, et al.

Teaching Materials:
How to Predict Lumber-Grade Yields for Graded Trees, USDA, Forest Service.
National Forest Log Scaling Handbook, USDA, Forest Service.

CONTENT/CONCEPT

12. SAWING LOGS INTO LUMBER

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

12.5 Demonstrate ability to operate circular saw

COURSE

Postsecondary

12.5

PERFORMANCE OBJECTIVE

P12.5 Given resources on sawmill operation and operating instructions, demonstrate ability to operate a circular saw. The work must be performed under supervision of instructor and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E12.5.1 Check teeth for sharpness and/or damange.

E12.5.2 Inspect work area to ensure safety.

E12.5.3 Demonstrate knowledge of pulley operation.

E12.5.4 Examine belts for operation.

E12.5.5 Check the electrical system.

E12.5.6 Maintain a constant flow of logs going through the saw.

E12.5.7 Explain process of feeding logs into saw.

E12.5.8 Check all work area for foreign material.

E12.5.9 Determine the necessary time to change saw blade.

E12.5.10 Sharpen saw teeth.

E12.5.11 Adjust saw for adequate operation.

CRITERION-REFERENCED MEASURE

C12.5 Demonstrate ability to operate a circular saw under supervision of instructor. Performance must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Demonstrate operation of circular saw and discuss operating procedures (E12.5.1-E12.5.11).
2. Have sawyer explain and demonstrate maintenance operations to students (E12.5.4-E12.5.11).

SELECTED TOOLS AND MATERIALS

Circular saw
Personal protective devices (eye and ear wear)
Instructor-prepared checklist on circular saw

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Circular Sawmills and Their Efficient Operation, USDA, Forest Service.
National Ag Occupations Competency Study: National Study for Identifying and Validating Essential Agricultural Competencies Needed for Entry and Advancement in Major Agriculture and Agribusiness Occupations, Government Printing Office.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASKS/COMPETENCIES

13.1 Demonstrate ability to clean and refill pools

13.2 Develop a plan to establish living fences

13.3 Inspect recreational areas

13.4 Describe the procedures involved in promoting, organizing, and conducting a hunting and/or fishing expedition

13.5 Direct and lead people participating in indoor and outdoor recreation

13.6 Advise others on navigational methods

13.7 Develop rules for campgrounds

13.8 Order weekly campground supplies

13.9 Locate trails, considering scenery and grades

13.10 Plan sled and snowmobile areas

13.11 Select method to control insects in camping areas

13.12 Design recreational enterprise

13.13 Identify and plan the financial backing needed for a recreational facility

13.14 Assist in the formulation and development of interpretive program services

13.15 Plan security programs for recreational enterprises

13.16 Design special features including a skeet range, rifle and pistol area, and archery range

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.1 Demonstrate ability to clean and refill pools

COURSE

Natural Resources Management IV
(8042)

13.1

PERFORMANCE OBJECTIVE

P13.1 Given access to a swimming pool and the required cleaning tools and supplies, demonstrate ability to clean and refill the pool. Safety procedures must be followed, and no slicks, skim, dirt, or other debris should be present after refilling. Performance must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.1.1 Drain pool by opening valve.

E13.1.2 Remove dirt and other debris from pool.

E13.1.3 Clean pool surfaces with acid solution following manufacturer's recommendations.

E13.1.4 Identify necessary repairs to pool surfaces.

E13.1.5 Paint areas, if needed.

E13.1.6 Clean overflow drain.

E13.1.7 Rinse pool surfaces thoroughly.

E13.1.8 Close drain and refill pool to proper depth.

E13.1.9 Apply proper amount of chlorine to water.

E13.1.10 Observe safety precautions while cleaning and refilling the swimming pool.

CRITERION-REFERENCED MEASURE

C13.1 Demonstrate ability to clean and refill a pool. Safety procedures must be followed, and no slicks, skim, dirt, or other debris should be present after refilling. Performance must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss the procedure to follow in cleaning and refilling pools, especially noting safety precautions to be followed (E13.1.1-E13.1.10).
2. Have students perform the task of cleaning pool surfaces (E13.1.2, E13.1.3).
3. Have students secure materials and make repairs and apply paint required (E13.1.4, E13.1.5).
4. Examine student's work before allowing the refilling of pool (E13.1.7-E13.1.10).
5. Have a representative of a local pool company discuss the topic with the class (E13.1.1-E13.1.10).

SELECTED TOOLS AND MATERIALS

Brochures on pool maintenance
Chlorine
(Note: Safety precautions must be followed in handling chlorine for pool applications)
Skimmer
Instructor-prepared checklist on cleaning and refilling pools

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.2 Develop a plan to establish living fences

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

13.2

PERFORMANCE OBJECTIVE

P13.2 Given resources on managing recreational enterprises and a case-study situation, develop a plan to establish living fences to provide food and shelter for birds and small animals. Written plan must select appropriate plant materials and be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.2.1 Determine plant materials suitable for living fences.

E13.2.2 Determine local bird and wildlife species and coordinate this information with choice of plant materials.

E13.2.3 Assess proposed planting site and determine if plant material is appropriate for the site.

E13.2.4 Describe procedures to follow to prepare site for planting.

E13.2.5 Identify method of placing plant materials in ground using proper spacing to allow for growth.

E13.2.6 Identify care required to establish plant materials.

E13.2.7 Explain the maintenance that would be required to keep plant materials in a condition to provide food and shelter.

CRITERION-REFERENCED MEASURE

C13.2 Develop a plan to establish living fences to provide food and shelter for birds and small animals. Written plan must select appropriate plant materials and be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Conduct a field trip to a local park, estate, or business that contains living fences. Have students observe to determine plant materials selected, their locations, and their usage by birds and wildlife (E13.2.1-E13.2.2).
2. Have students establish living fences at a suitable site and provide periodic maintenance (E13.2.1-E13.2.7).
3. Establish a nature area near the school site and have the FFA Chapter be responsible for its upkeep (E13.2.1-E13.2.7).

SELECTED TOOLS AND MATERIALS

Case study situation
Instructor-prepared checklist on establishing living fences

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Plant Materials for Conservation, USDA, Soil Conservation Service.
Wildlife Habitat Improvement Handbook, USDA, Forest Service.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.3 Inspect recreational areas

COURSE

Natural Resources Management V
(8044)

13.3

PERFORMANCE OBJECTIVE

P13.3 Given a field trip to an appropriate recreational enterprise, inspect recreational area. Assessment of factors such as cleanliness, proper maintenance of the recreational area, and compliance with the rules must be congruent with the instructor's assessment, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.3.1 Determine proper condition for a specific recreational area.

E13.3.2 Describe orally whether recreational area meets standards of inspection.

E13.3.3 Identify what actions are to be taken in cases of noncompliance.

E13.3.4 Arrange for or perform work necessary to return recreational area to proper condition.

CRITERION-REFERENCED MEASURE

C13.3 Inspect recreational areas by checking for cleanliness, proper maintenance of the recreational area, and compliance with the rules. Assessment should be congruent with the instructor's assessment, according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students take field trips and inspect several recreational areas and give an oral summary of the condition of each area (E13.3.1-E13.3.4).
2. Assign students to fill out a checksheet on the recreational area and compare with instructor's responses (E13.3.1-E13.3.3).
3. Have students conduct the work needed to put a recreational area in proper condition (E13.3.4).

SELECTED TOOLS AND MATERIALS

Brochures describing recreational area regulations
Instructor-prepared checklist on recreational area

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.4 Describe the procedures involved in promoting, organizing, and conducting a hunting and/or fishing expedition

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

13.4

PERFORMANCE OBJECTIVE

P13.4 Given a case study on a recreational enterprise, describe the procedures involved in promoting, organizing, and conducting a hunting and/or fishing expedition in a written report. Report must contain the information listed in C13.4 and must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.4.1 Organize the hunting and/or fishing parties.

E13.4.2 Select the geographical location for the expedition.

E13.4.3 Estimate food and shelter needs, equipment, supplies; secure and store before and during the expedition.

E13.4.4 Map and plan routes for the expedition.

E13.4.5 Obtain required licenses for members of the party.

E13.4.6 Plan daily schedules.

E13.4.7 Plan arrangements to provide transportation.

E13.4.8 Determine per person charges in order to ensure a profit to the outfitter.

CRITERION-REFERENCED MEASURE

C13.4 Describe the procedures involved in promoting, organizing, and conducting a hunting and/or fishing expedition in a written report. Report must contain the following information and must be judged acceptable according to instructor-prepared checklist:

a. description of expedition-purpose, size of party, length of trip in days
b. list of provisions
c. map of routes selected and reasons for choosing route
d. licenses required by group
e. transportation arrangements
f. costs of the expedition.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss their experiences during hunting and/or fishing trips that are associated with poor planning, forgetfulness, and lack of knowledge in order to establish the need for planning (E13.4.1-E13.4.8).

2. Write to various outfitters requesting information for an identical hypothetical trip that each is to conduct. Explain that the purpose of the letter is to gain comparable responses from several sources to share with students (E13.4.1-E13.4.8).

3. Have the class or the FFA Chapter sponsor a hunting and/or fishing expedition for the class or chapter members. Have members take responsibility for promoting, organizing, and conducting the expedition (E13.4.1-E13.4.8).

SELECTED TOOLS AND MATERIALS

Case study situation
Instructor-prepared checklist on fishing expedition

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.5 Direct and lead people participating in indoor and outdoor recreation

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

13.5

PERFORMANCE OBJECTIVE

P13.5 Given access to an appropriate recreational enterprise, direct and lead people participating in indoor and outdoor recreation. An acceptable rating must be achieved on an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.5.1 Analyze abilities and needs of individuals and groups participating in indoor and outdoor recreation.

E13.5.2 Select appropriate activities for indoor and outdoor settings for specific groups.

E13.5.3 Secure supplies, materials, or equipment needed for recreation.

E13.5.4 Provide directions and motivation necessary to have people participate in indoor and outdoor recreation.

E13.5.5 Evaluate the success of the recreational activity.

CRITERION-REFERENCED MEASURE

C13.5 Direct and lead people participating in indoor and outdoor recreation. An acceptable rating must be achieved on an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss how to analyze the abilities and needs of persons participating in indoor and outdoor recreation (E13.5.1).
2. Suggest possible activities appropriate to indoor and outdoor recreation for different age groups (E13.5.2).
3. Lead a particular indoor or outdoor recreational activity and evaluate the results (E13.5.3-E13.5.5).

SELECTED TOOLS AND MATERIALS

Supplies, materials, or equipment for crafts, games, etc.
Instructor-prepared checklist on recreational activities

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Activities for Learning About Conservation of Forest Resources: A Guide For Leaders of Youth Groups, USDA, Forest Service.

Application

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.6 Advise others on navigational methods

COURSE

Natural Resources Management V
(8044)

13.6

PERFORMANCE OBJECTIVE

P13.6 Given instruction on boating, advise others on navigation methods in an oral report to the class. A three- to five-minute presentation should be made on a specific aspect of boat navigation. Information must be approved by the instructor as technically correct and report must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.6.1 Describe boat registration procedures in Virginia.

E13.6.2 List safety equipment required by various-sized craft.

E13.6.3 Describe "rules of the road" for boat navigation.

E13.6.4 Identify unlawful acts of boat operation.

E13.6.5 Describe waterway markers and storm warning signals.

E13.6.6 Define terminology associated with boat navigation.

CRITERION-REFERENCED MEASURE

C13.6 Advise others on navigational methods by completing a three- to five-minute oral report to the class on some aspect of boat navigation. Information must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure copies of the Motorboat Owner's Guide and have students prepare oral presentations on a specific aspect of navigation (E13.6.1-E13.6.6).
2. Prepare a handout on matching the terminology associated with boat navigation (E13.6.6).
3. Have students give presentations to local sportsperson's groups on navigational methods (E13.6.1-E13.6.6).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on report on navigation

SELECTED AUDIOVISUAL MATERIALS

Films: (1) Prescription for Boating Safety and Pleasure and (2) Whitewater Primer, Commission of Game and Inland Fisheries.

SELECTED REFERENCES

Books:
Basic Canoeing Techniques, Rulon D. Skinner.

Teaching Materials:
Motorboat Owner's Guide, Virginia Commission of Game and Inland Fisheries.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.7 Develop rules for campgrounds

COURSE

Natural Resources Management V
(8044)

13.7

PERFORMANCE OBJECTIVE

P13.7 Given a description of a campground and its facilities, develop a list of rules for campers using the campground and facilities. List at least three rules for each of the following: hazardous areas, proper use of equipment, safety rules, boundaries for activities, and personal conduct. Rules must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.7.1 Identify situations in advance that require the formulation of a written rule.

E13.7.2 Determine the rules used by similar campgrounds.

E13.7.3 Explain the need for a particular rule.

E13.7.4 Compose rules that are stated in direct and unambiguous manner.

CRITERION-REFERENCED MEASURE

C13.7 Develop a list of rules for campers using the campground and facilities. List at least three rules for each of the following: hazardous areas, proper use of equipment, safety rules, boundaries for activities, and personal conduct. Rules must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students discuss situations they have encountered in campgrounds that related to the need or application of campground rules (E13.7.1).
2. Visit local campgrounds or contact the operator to obtain a copy of the campground's rules (E13.7.2).
3. Have students role-play incidents at campgrounds and have the class determine whether a written rule could have helped avoid the incident (E13.7.1-E13.7.4).
4. Have students practice composing rules that would be helpful in campground administration (E13.7.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on campground rules

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Park Planning Handbook, Monty L. Christiansen.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.8 Order weekly campground supplies

COURSE

Natural Resources Management V
(8044)

13.8

PERFORMANCE OBJECTIVE

P13.8 Given an appropriate case study and forms, order weekly campground supplies by completing a weekly order form. Quantities of supplies ordered should be consistent with the quantities ordered by the instructor.

SELECTED ENABLING OBJECTIVES

E13.8.1 Order parts for campground equipment.

E13.8.2 Determine appropriate order for food supplies consumed or sold on the premises.

E13.8.3 Order medical supplies consumed or sold on the premises.

E13.8.4 Identify consumable supplies such as paper products, chemicals, sanitizers required for campground operation and order only as supplies run low.

E13.8.5 Apply mathematical skills associated with ordering weekly supplies.

CRITERION-REFERENCED MEASURE

C13.8 Order weekly campground supplies by completing a weekly order form for a case situation prepared by the instructor. Quantities ordered must be consistent with the quantities specified by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a weekly order form that can be used to order campground supplies (E13.8.1-E13.8.5).
2. Prepare several examples and have students perform the mathematical calculations necessary to determine quantities needed (E13.8.5).
3. Have students calculate total quantities of supplies and compare with instructor's results (E13.8.1-E13.8.5).
4. Assist students in ordering supplies needed for an FFA meeting or a banquet (E13.8.1-E13.8.5).

SELECTED TOOLS AND MATERIALS

Calculator
Case study situation
Order forms

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.9 Locate trails, considering scenery and grades

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

13.9

PERFORMANCE OBJECTIVE

P13.9 Given access to the site of a recreational enterprise, locate trails after considering scenery and grades present. Instructor should approve the proposed plan for trail layout according to checklist.

SELECTED ENABLING OBJECTIVES

E13.9.1 Examine site to discover scenery and grades involved.

E13.9.2 Determine characteristics of self-guiding trails.

E13.9.3 Mark and clear trails in harmony with surroundings--primitive to well-developed.

E13.9.4 Provide bridging that meets or exceeds safety standards.

E13.9.5 Develop rest areas adjacent to the trail.

E13.9.6 Establish and maintain safety hazard warning signs.

E13.9.7 Plan for adequate drainage from trail to minimize erosion.

E13.9.8 Determine liability risks from establishment of trails or from non-establishment.

E13.9.9 Apply mathematical skills associated with locating trails.

CRITERION-REFERENCED MEASURE

C13.9 Locate trails after considering the scenery and grades present at a site. Instructor should approve the proposed trail location, according to checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit a recreational enterprise to study the location of trails (E13.9.1, E13.9.2).
2. Establish a self-guided trail for a recreational enterprise in the local community. This could be a park or school site (E13.9.1-E13.9.9).
3. Have students prepare slides showing before and after scenes for a trail (E13.9.1-E13.9.7).

SELECTED TOOLS AND MATERIALS

Camera
Instructor-prepared checklist for locating trails

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
National Forest Landscape Management: Timber, pp. 2-64, USDA, Forest Service.
Trail Deterioration and Maintenance, USDA, Forest Service.

Application

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.10 Plan sled and snowmobile areas

COURSE

Natural Resources Management V
(8044)

13.10

PERFORMANCE OBJECTIVE

P13.10 Given instruction on managing recreational enterprises, plan sled and snowmobile areas. A written plan should contain the items listed in C13.10 and meet with approval according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.10.1 Identify possible sites for sled and snowmobile areas.

E13.10.2 Explain method to clear and mark trails and paths.

E13.10.3 Provide for rest stations, including bathroom facilities.

E13.10.4 Develop an equipment rental plan, including insurance.

E13.10.5 Describe a plan for equipment maintenance and repair.

E13.10.6 Identify a plan to provide for safety and patrolling of the area.

E13.10.7 Apply mathematical skills associated with planning the area.

CRITERION-REFERENCED MEASURE

C13.10 Plan sled and snowmobile areas by developing a written plan that meets with approval according to instructor-prepared checklist and contains the following items:

a. sketch of site showing proposed sled and snowmobile trails, rest stations, and equipment storage facilities
b. an equipment rental plan (including provisions for operator and owner insurance coverage)
c. plan for securing sled and snowmobile areas.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Visit a recreational enterprise that currently conducts sledding and snowmobiling activities (E13.10.1).
2. Discuss how to develop a plan for sled and snowmobile areas containing the items listed in C13.10 (E13.10.1-E13.10.7).
3. Provide labor for actual construction of a sled or snowmobile area (E13.10.1-E13.10.6).

SELECTED TOOLS AND MATERIALS

Maps of proposed site (road maps and topographic map)
Instructor-prepared checklist for planning sled areas

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.11 Select method to control insects in camping areas

COURSE

Natural Resources Management V
(8044)

13.11

PERFORMANCE OBJECTIVE

P13.11 Given instruction on insecticides and their applications, select method to control insects in the camping area. The method of control selected must be approved according to an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.11.1 Identify major insects infesting a camping area.

E13.11.2 Determine methods of controlling insects in the camping area.

E13.11.3 List advantages and disadvantages of each insect control method.

E13.11.4 Prepare pesticides following label directions.

E13.11.5 Determine effectiveness of method used to control insects.

E13.11.6 Apply mathematical skills associated with controlling insects.

CRITERION-REFERENCED MEASURE

C13.11 Select method to control insects in the camping area. The method of control selected must be approved according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Identify major insect problems within a camping area (E13.11.1).
2. Have students suggest or research methods used to control insects in camping areas (E13.11.2).
3. Visit a camping area and have students select various methods of insect control and determine their effectiveness (E13.11.1-E13.11.6).

SELECTED TOOLS AND MATERIALS

Aerosol insect repellents
Fogger
Hand sprayer
Instructor-prepared checklist to control insects

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Be Safe from Insects in Recreation Areas, USDA, Science and Education Administration.
The Insect Identification Manual, Vocational Education Production.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.12 Design recreational enterprise

COURSE

Postsecondary

13.12

PERFORMANCE OBJECTIVE

P13.12 Given an actual or hypothetical site, design a recreational enterprise by developing a written plan. Acceptable performance will be achieved by a written plan that contains the elements listed in C13.12 and is approved according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.12.1 Determine the major types of recreational enterprises.

E13.12.2 Sketch a rough design of the recreational enterprise.

E13.12.3 Determine the management needs for the enterprise.

E13.12.4 Identify the capital needs for the enterprise selected.

E13.12.5 Estimate the attendance and gross receipts for the enterprise.

E13.12.6 Identify the labor needs for the recreational enterprise.

E13.12.7 Estimate the operating costs for the enterprise.

E13.12.8 Estimate overhead costs of maintaining the enterprise.

E13.12.9 Prepare an income and expense budget for three years.

E13.12.10 Apply mathematical skills associated with designing recreational enterprises.

CRITERION-REFERENCED MEASURE

C13.12 Design a recreational enterprise in a written plan that is approved according to instructor-prepared checklist and contains the following elements:

a. factors that influenced choice of an enterprise
b. rough sketch
c. management needs
d. capital needs
e. attendance and gross receipts figures
f. labor needs
g. operating costs
h. overhead costs
i. income and expense budget.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a case study or determine an actual site for which students are to design a recreational enterprise. After students complete their plan that includes the information listed in C13.12, have them compare their plan with several hypothetical plans or with the actual developed site (E13.12.1-E13.12.10).
2. Have students review master plan for an established recreational enterprise to determine components of the plan (E13.12.1-E13.12.10).
3. Invite a local architect or recreational planner to speak to the class about the topic in general or about one of the specific components of the master planning (E13.12.1-E13.12.10).

SELECTED TOOLS AND MATERIALS

Case study materials
Instructor-prepared checklist on designing recreational enterprise

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Park Planning Handbook, Monty L. Christiansen.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.13 Identify and plan the financial backing needed for a recreation facility

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

13.13

PERFORMANCE OBJECTIVE

P13.13 Given an actual or hypothetical site for a recreational enterprise, identify and plan the financial backing needed for a recreation facility in a written report. Successful performance will be an acceptable rating on report according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.13.1 Determine amount of capital that must be borrowed.

E13.13.2 Develop a cash-flow projection for the facility.

E13.13.3 Determine a repayment schedule for loans.

E13.13.4 Identify sources of financial backing available to individuals for recreational facility development.

E13.13.5 Describe sources of financial backing available to municipal governments.

CRITERION-REFERENCED MEASURE

C13.13 Identify and plan the financial backing needed for a recreation facility in a written report. Successful performance will be an acceptable rating on report according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare financial statements that are necessary in order to secure a loan (E13.13.1-E13.13.3).

2. Have students report to class on the availability of financial assistance from the following institutions: Farmers' Home Administration, Production Credit Association, commercial banks, Small Business Administration, and the Agricultural Stabilization and Conservation Service (E13.13.1-E13.13.5).

3. Write a description that identifies and plans the financial backing needed for a recreation facility. Compare each student's description with the instructor's description (E13.13.1-E13.13.5).

SELECTED TOOLS AND MATERIALS

Case study materials
Instructor-prepared description of financial backing
Instructor-prepared checklist

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Financing New Cooperatives, USDA, Economics, Statistics, and Cooperative Service.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.14 Assist in the formulation and development of interpretive program services

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

13.14

PERFORMANCE OBJECTIVE

P13.14 Given a case study situation involving a recreational enterprise, assist in the formulation and development of interpretive program services and deliver a ten-minute oral presentation for the case study situation. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.14.1 Identify characteristics of these four groups: individuals, families, tours, and organized clubs.

E13.14.2 Determine orientation information needs of each group.

E13.14.3 List the goals, objectives, primary theme, and interpretive activites.

E13.14.4 Plan for campfire programs, guided walks, demonstrations, point of interest (scenic view) programs, morning and afternoon programs, guest programs, etc.

E13.14.5 Identify ways of getting participant involvement during interpretive session.

E13.14.6 Demonstrate ability to use interpretive aids (e.g., hand lens, ruler) effectively.

CRITERION-REFERENCED MEASURE

C13.14 Assist in the formulation and development of interpretive program services and deliver a ten-minute oral presentation for a case-study situation. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students determine the job responsibilities of a naturalist and the assistant(s) to the naturalist (E13.14.1-E13.14.6).
2. Have students assist a naturalist in formulating and developing an interpretive program for a particular site (E13.14.1-E13.14.6).
3. Develop and present an interpretive program to groups such as elementary school children on local trails or parks (E13.14.1-E13.14.6).

SELECTED TOOLS AND MATERIALS

Case study situation
Diameter tape
Hand lens
Hand mirror
Increment borer
Jar of fish eggs
Plaster of Paris
Ruler
Sampling net or tea strainer
Straight pins
Visual aids or specimens
Instructor-prepared checklist on program services

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Naturalist Notes, USDA, Forest Service.

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

13.15 Plan security programs for recreational enterprises

COURSE

Postsecondary

13.15

PERFORMANCE OBJECTIVE

P13.15 Given a list of security measures and a description of a recreational enterprise, plan security programs for the recreational enterprises in a written report. The proposed plan must include the allotted budget figures within the limits established by the case-study, be approved by the instructor according to a checklist, and include all security measures listed in C13.15.

SELECTED ENABLING OBJECTIVES

E13.15.1 List the security measures to determine applicability to the recreational enterprise.

E13.15.2 Identify budget constraints of the organization.

E13.15.3 Describe the applicability of each security measure and compute its costs.

CRITERION-REFERENCED MEASURE

C13.15 Plan security programs for a recreational enterprise in a written report. The proposed plan must include the allotted budget figures within the limits established by the case study, be approved by the instructor according to a checklist, and include the following security measures:

a. personal identification system
b. gate or door checks
c. lighting
d. structural restraints
e. periodic police patrols
f. electronic alarm and surveillance equipment
g. human and/or canine patrols.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Visit a recreational enterprise and determine the security measures that have been employed (E13.15.1).
2. Examine manufacturer's literature for security devices to determine applicability to a natural resources enterprise (E13.15.3).
3. Have students prepare written plan for a security program for a recreational enterprise (E13.15.1-E13.15.3).
4. Have students clip newspaper articles during the hunting season that illustrate enforcement problems (E13.15.1).

SELECTED TOOLS AND MATERIALS

Case study materials
Instructor-prepared checklist on security programs

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Resource Law Enforcement, Vocational Education Productions.

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

13. MANAGING RECREATIONAL ENTERPRISES

TASK/COMPETENCY

13.16 Design special features including a skeet range, rifle and pistol area, and archery range

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

13.16

PERFORMANCE OBJECTIVE

P13.16 Given appropriate guidelines for a recreational enterprise, design special features including a skeet range, rifle and pistol area, and an archery range and prepare a written report. Successful peformance will be an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E13.16.1 Assess land area and topographical needs of special features.

E13.16.2 Determine if safety factors that must be considered can be incorporated into the available land area.

E13.16.3 Identify the number of people to be accommodated at one time.

E13.16.4 Develop a list of equipment, supplies, and materials needed.

E13.16.5 Sketch a freehand design of the area and its various ranges.

E13.16.6 Apply mathematical skills associated with designing these features.

CRITERION-REFERENCED MEASURE

C13.16 Design the special features of a recreational enterprise, including a skeet range, rifle and pistol area, and an archery range, and prepare a written report. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Visit a park or campground that has one or more of these special features available (E13.16.1).
2. Develop a list of safety factors that must be considered in designing these ranges (E13.16.2).
3. Sketch a freehand drawing of the proposed ranges and note installation of buildings and equipment (E13.16.5-E13.16.6).
4. Discuss methods to determine the number of people to be accommodated at one time and the supplies, equipment, and materials they will need (E13.16.3, E13.16.4).

SELECTED TOOLS AND MATERIALS

Instructor-prepared list of safety factors
Instructor-prepared checklist on designing special features

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

14. SURVEYING LAND

TASKS/COMPETENCIES

14.1 Make linear measurements by pacing

14.2 Carry and set stakes

14.3 List the uses of surveys

14.4 Set up and operate surveying instruments

14.5 Adjust and clean surveying instruments

14.6 Identify and correct malfunctions of surveying instruments

14.7 Locate and stake a terrace line

14.8 Determine field area of specific plots of land in acres

14.9 Measure and record distances, run compass lines, and identify topographic features.

14.10 Complete a surveying job

14.11 Demonstrate ability to use hand level or engineering level and tape

14.12 Write legal descriptions of a selected plot of land

14.13 Convert English measurement units to metric equivalents, and metric equivalents to units

14.14 Perform land line location and corner restoration work

Application

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.1 Make linear measurements by pacing

COURSE

Natural Resources Management IV
(8042)

14.1

PERFORMANCE OBJECTIVE

P14.1 Given instruction on surveying land, make linear measurements by pacing. Student must be able to pace 100 feet with less than 2% variation on level ground and less that 4% variation on sloping ground (over 2% slope).

SELECTED ENABLING OBJECTIVES

E14.1.1 Measure 100 feet with steel tape.

E14.1.2 Pace distance using a natural gait several times.

E14.1.3 Determine the average number of steps required to pace the measured distance.

E14.1.4 Calculate the total acreage of a given area of known distance by pacing.

E14.1.5 Define terminology associated with linear measurements.

E14.1.6 Apply mathematical skills associated with linear measurements and pacing.

CRITERION-REFERENCED MEASURE

C14.1 Make linear measurements by pacing. A 100-foot distance must be paced with less than 2% variation on level ground and less than 4% variation on sloping ground (over 2% slope).

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students guess the length of their natural stride and then have them calculate this length (E14.1.1-E14.1.3).

2. Have students practice pacing known distances several times to develop consistency of stride length (E14.1.3).

3. Measure the length and width of a field and have students pace the field and calculate total acreage to compare with calculated total based upon known measurements (E14.1.4, E14.1.6).

4. Develop a list of terminology associated with linear measurements and discuss with students (E14.1.6).

SELECTED TOOLS AND MATERIALS

Hammer
Stakes
Steel tape

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Natural Resources Measurements, pp. 45, 46, Thomas Avery.

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.2 Carry and set stakes

COURSE

Natural Resources Management IV
(8042)

14.2

PERFORMANCE OBJECTIVE

P14.2 Given the necessary tools and materials, carry and set stakes as specified by the instructor or in accordance with a site plan specifying the placement of stakes. Performance must satisfy all factors specified on instructor-provided rating sheet.

SELECTED ENABLING OBJECTIVES

E14.2.1 Demonstrate ability to set stakes in situations requiring horizontal and vertical control.

E14.2.2 Set stakes in situations requiring horizontal curves.

E14.2.3 Set stakes in situations requiring slope stakes for excavations or fills.

CRITERION-REFERENCED MEASURE

C14.2 Carry and set stakes as specified by the instructor or in accordance with a site plan specifying the placement of stakes. Performance must satisfy all factors specified on instructor-provided rating sheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students determine situations that would require the placement of stakes (E14.2.1-E14.2.3).

2. Set up a practice situation for each of the three enabling objectives and have students set stakes (E14.2.1-E14.2.3).

3. Arrange for students to be able to go and observe the placement of stakes for a highway or street construction (P14.2).

SELECTED TOOLS AND MATERIALS

Axe or hammer
Chain/tape
Developer's plans
Level
Level rod
Stakes
Site plan for stake placement
Instructor-provided rating sheet

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Land Survey Field Technician, V-TECS Catalog.

Application

CONTENT/CONCEPT
14. SURVEYING LAND

TASK/COMPETENCY
14.3 List the uses of surveys

PROGRAM
AGRICULTURAL RESOURCES
(03.0101)

COURSE
Natural Resources Management IV
(8042)

14.3

PERFORMANCE OBJECTIVE

P14.3 Given resources on land surveying, list the uses of surveys. At least three uses should be given for each of the categories listed in C14.3.

SELECTED ENABLING OBJECTIVES

E14.3.1 Define surveying as applied to natural resources measurements.

E14.3.2 Differentiate plane surveying and deodetic surveying.

E14.3.3 Describe land or boundary surveys and their uses.

E14.3.4 Identify the uses of topographic surveys, hydrographic surveys, and photogrammetric surveys.

CRITERION-REFERENCED MEASURE

C14.3 List the uses of surveys by giving at least three uses for each of the following categories:

a. uses on the farm or in natural resources management areas
b. uses on construction sites
c. uses on forested, tillable, or water-covered sites.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students brainstorm all the locations where they have seen surveyors working and develop a list on the chalkboard (E14.3.1).
2. Have students determine the need for plane surveying and geodetic surveying by examining an atlas and a globe (E14.3.2).
3. Bring examples of land, topographic, hydrographic, and photogrammetric surveys to class for comparison and contrast (E14.3.3, E14.3.4).

SELECTED TOOLS AND MATERIALS

Surveys--samples of each type
Instructor-prepared checklist on uses of surveys

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT
14. SURVEYING LAND

PROGRAM
AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY
14.4 Set up and operate surveying instruments

COURSE
Natural Resources Management V
(8044)

14.4

PERFORMANCE OBJECTIVE

P14.4	Given resources on surveying land and appropriate instruments, set up and operate surveying instruments, such as the level. All written and oral instructions of the instructor must be followed and performance must meet all criteria on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E14.4.1	List or describe the parts of the level.
E14.4.2	Demonstrate ability to set up the tripod to provide a firm base.
E14.4.3	Remove level from case and attach securely to tripod.
E14.4.4	Remove dust cap and replace with sun shade.
E14.4.5	Adjust instrument to level in all directions by centering leveling bubbles.
E14.4.6	Focus level crosshairs on the target.
E14.4.7	Demonstrate ability to view rod and read elevations.
E14.4.8	Define terminology associated with surveying instruments.
E14.4.9	Apply mathematical skills associated with surveying.

CRITERION-REFERENCED MEASURE

C14.4	Set up and operate surveying instruments such as the level, by following written and oral instructions given by the instructor. Performance must meet all criteria on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Assign students to read owner's manuals for the particular surveying instrument to be used (E14.4.1-E14.4.9).
2. Have students outline a general procedure for setting up instruments (E14.4.2-E14.4.7).
3. Evaluate each student using the checksheet after several trial practices (P14.4).

SELECTED TOOLS AND MATERIALS

Surveying instrument checksheet
Surveying instruments, e.g., levels, stadia
Owner's manuals
Instructor-prepared checklist on operating surveying equipment

SELECTED AUDIOVISUAL MATERIALS

Slidefilm: Using the Level in Farm Surveying, Vocational Agricultural Service.

SELECTED REFERENCES

Teaching Materials:
Agricultural Surveying, Vocational Agriculture Service.

Application

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.5 Adjust and clean surveying instruments

COURSE

Natural Resources Management V
(8044)

14.5

PERFORMANCE OBJECTIVE

P14.5 Given access to appropriate instruments used for surveying land, adjust and clean surveying instruments. All instructions and precautions outlined in the owner's manual should be followed, and performance must be in accordance with manufacturer's specifications.

SELECTED ENABLING OBJECTIVES

E14.5.1 Identify adjustments made to surveying instrument as they are mentioned in the owner's manual.

E14.5.2 Determine materials used for cleaning surveying instruments.

E14.5.3 Outline a procedure for cleaning surveying instruments.

CRITERION-REFERENCED MEASURE

C14.5 Adjust and clean surveying instruments by following all instructions and precautions outlined in the owner's manual. Performance must be in accordance with manufacturer's specifications.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students locate information in owner's manual pertaining to adjustment of surveying instrument (E14.5.1).

2. Set up practice situations where the instrument is out of adjustment and have students correct the problem (E14.5.1).

3. Prepare a cleaning and maintenance schedule for each surveying instrument. Leave a form with each instrument and have students initial when work is completed (E14.5.2-E14.5.3).

SELECTED TOOLS AND MATERIALS

Cleaning materials
Owner's manuals/manufacturer's specifications
Surveying instruments
Instructor-prepared cleaning and maintenance schedule and forms

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.6 Identify and correct malfunctions of surveying instruments

COURSE

Natural Resources Management V
(8044)

14.6

PERFORMANCE OBJECTIVE

P14.6 Given appropriate surveying instruments with various malfunctions, identify and correct malfunctions of the instruments. Each malfunction discussed in class must be identified and corrected according to manufacturer's specifications, or instruments must be sent for factory correction if necessary to correct defect.

SELECTED ENABLING OBJECTIVES

E14.6.1 List possible malfunctions of surveying instruments.

E14.6.2 Identify common malfunctions when demonstrated.

E14.6.3 Determine procedures for correcting each malfunction.

E14.6.4 Determine those situations that require factory assistance for correction of the malfunction.

CRITERION-REFERENCED MEASURE

C14.6 Identify and correct malfunctions of surveying instruments. Each malfunction discussed in class must be identified and corrected according to manufacturer's specifications, or instruments must be sent for factory correction if necessary to correct defect.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a list of possible malfunctions of surveying instruments (E14.6.1).

2. Demonstrate the possible malfunctions for the class and encourage students to discuss (E14.6.2).

3. Demonstrate how to make corrections for malfunctions or have students diagnose the need for factory assistance (E14.6.3, E14.6.4).

SELECTED TOOLS AND MATERIALS

Surveying instruments
Instructor-prepared list of possible malfunctions
Owner's manuals/manufacturer's specifications

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

—— Application ——

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.7 Locate and stake a terrace line

COURSE

Natural Resources Management V
(8044)

14.7

PERFORMANCE OBJECTIVE

P14.7 Given access to a plot of land requiring terracing, locate and stake a terrace line. The staked line must be consistent with a plan developed by the local Soil Conservation Service representative and must be approved according to all factors on instructor-prepared rating sheet.

SELECTED ENABLING OBJECTIVES

E14.7.1 Explain a plan detailing the location of a terrace line.

E14.7.2 Assemble materials needed for staking terrace line.

E14.7.3 Stake terrace line to accuracy required by this type of work.

E14.7.4 Compare staked line with details of plan and correct any errors.

CRITERION-REFERENCED MEASURE

C14.7 Locate and stake a terrace line that follows the written plan of the local Soil Conservation Service representative and is approved according to all factors on instructor-prepared rating sheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure a plan for a terrace line from the local Soil Conservation Service representative (E14.7.1).

2. Have students determine all materials needed to complete the task (E14.7.2).

3. Assign teams and have students complete the task according to the plan (E14.7.3).

4. Invite the Soil Conservation Service representative to review and comment upon work completed by the class (E14.7.4).

SELECTED TOOLS AND MATERIALS

Axe or hammer
Stakes
Surveying instruments for staking terrace line
Instructor-prepared rating sheet on staking terrace lines
Soil Conservation Service terrace line plan

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.8 Determine field area of specific plots of land in acres

COURSE

Natural Resources Management V
(8044)

14.8

PERFORMANCE OBJECTIVE

P14.8 Given resources for surveying land, determine the field area, in acres, of specific plots of land. Plots may be triangular, rectangular, trapezoidal, trapezium, or curved boundaries. Measurements should be within one acre per twenty acres for field situations and 100 percent correct for classroom situations, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E14.8.1 Identify boundaries of the specific plot of land.

E14.8.2 Determine shapes and measure distances within the boundaries.

E14.8.3 Secure formulas for calculating field area of various shapes.

E14.8.4 Define terminology associated with determining field area.

E14.8.5 Apply mathematical skills associated with determining field area.

CRITERION-REFERENCED MEASURE

C14.8 Determine the field area, in acres, of specific plots of land. Plots may be triangular, rectangular, trapezoidal, trapezium, or curved boundaries. Measurements should be within one acre per twenty acres for field situations and 100 percent correct for classroom situations, according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a handout of exercises showing several different-shaped plots of land (E14.8.1).

2. Have students calculate the field area of these plots using formulas required for performing the calculations (E14.8.2-E14.8.5).

3. Select several plots of known acreage and have students determine the acreage on-site (E14.8.1-E14.8.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on determining field area problems
Map of specific plot of land
Ruler
Tape
Instructor-prepared checklist on determining field area

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Agricultural Surveying, Vocational Agriculture Service.

Application

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.9 Measure and record distances, run compass lines, and identify topographic features

COURSE

Postsecondary

14.9

PERFORMANCE OBJECTIVE

P14.9 Given a series of exercises and instruments, measure and record distances, run compass lines, and identify topographic features. Acceptable performance will be a satisfactory rating on all factors on an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E14.9.1 Measure and record distances to allowable tolerances.

E14.9.2 Explain how to run compass lines using a transit/theodolite.

E14.9.3 Relate topographic symbols to actual site condition.

E14.9.4 Define terminology associated with identifying topographic features.

E14.9.5 Apply mathematical skills associated with measuring distances.

CRITERION-REFERENCED MEASURE

C14.9 Measure and record distances, run compass lines, and identify topographic features. A satisfactory rating must be achieved on all factors on an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare a series of exercises that require students to measure and record distances, and run compass lines using a transit/theodolite (E14.9.1, E14.9.2).

2. Secure topographic maps of an area near the school. Mark several spots on the map with an X and have students locate the spots on the actual site (E14.9.3-E14.9.5).

3. Conduct a contest exercise with this task and recognize the persons achieving acceptable performance (P14.9).

SELECTED TOOLS AND MATERIALS

Exercises on measuring and recording
Surveying instruments
Instructor-prepared checklist on surveying tasks
Topographic maps

SELECTED AUDIOVISUAL MATERIALS

Slidefilm: Recording Field Notes for Surveying, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Principles and Practices of Surveying, Vol. 1 Elementary Surveying, C.B. Breed, et al.

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.10 Complete a surveying job

COURSE

Postsecondary

14.10

PERFORMANCE OBJECTIVE

P14.10 Given resources on surveying land, complete a surveying job for a situation determined by the instructor. An acceptable rating must be achieved on all factors of the instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E14.10.1 Assemble all tools and materials required to complete the surveying job.

E14.10.2 Determine personnel needs in order to complete the surveying job.

E14.10.3 Set up equipment and record measurements.

E14.10.4 Identify sources and types of errors in using survey equipment.

E14.10.5 Recheck readings and recordings for possible error.

E14.10.6 Apply mathematical skills associated with surveying.

E14.10.7 Define terminology associated with surveying.

CRITERION-REFERENCED MEASURE

C14.10 Complete a surveying job for a situation determined by the instructor. An acceptable rating must be achieved on all the factors of the instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure a form for recording traverse computations or other information desired (E14.8.1).

2. Have students determine tools, materials, and personnel needs for a particular surveying job (E14.8.1, E14.8.2).

3. Assign students to prepare a chart outlining sources and types of errors that can occur in surveying (E14.10.4).

4. Have students complete a surveying job and invite a local surveyor to comment upon how the job would best be completed (E14.10.1-E14.10.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared situations requiring surveying
Surveying instruments
Instructor-prepared checklist on traverse computations
Traverse computation forms

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Principles and Practices of Surveying, Vol. 1, Elementary Surveying, C. B. Breed, et al.

CONTENT/CONCEPT

14. SURVEYING LAND

TASK/COMPETENCY

14.11 Demonstrate ability to use hand level or engineering level and tape

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

14.11

PERFORMANCE OBJECTIVE

P14.11 Given tools and resources for surveying land, demonstrate ability to use hand level or engineering level and tape to complete an exercise assigned by the instructor. An acceptable rating must be achieved on all factors on instructor-prepared rating sheet.

SELECTED ENABLING OBJECTIVES

E14.11.1 Determine operating procedures for hand level and engineering level by reading owner's manuals.

E14.11.2 Identify correct operating procedures for each piece of equipment.

E14.11.3 Apply mathematical skills associated with using hand or engineering level.

CRITERION-REFERENCED MEASURE

C14.11 Demonstrate ability to use hand level or engineering level and tape to complete an exercise assigned by the instructor. An acceptable rating must be achieved on all factors on instructor-prepared rating sheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare an exercise requiring students to use a hand level and an engineering level to peform the same task (E4.11.1, E14.11.2).

2. Have students compare accuracy obtained with the two instruments for the same task (E14.11.3).

SELECTED TOOLS AND MATERIALS

Exercises for measuring with hand or engineering level
Engineering level
Hand level
Leveling rod with target
Tape
Instructor-prepared rating sheet on hand or engineering level

SELECTED AUDIOVISUAL MATERIALS

Slidefilm: Using the Steel Tape in Surveying, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Principles and Practices of Surveying, Vol. 1, Elementary Surveying, C. B. Breed, et al.

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.12 Write legal descriptions of a selected plot of land

COURSE

Postsecondary

14.12

PERFORMANCE OBJECTIVE

P14.12 Given reference material on writing descriptions, write legal descriptions of a selected plot of land. Descriptions must match with a recorded description of known accuracy when compared, and all factors on an instructor-prepared checklist must be judged acceptable.

SELECTED ENABLING OBJECTIVES

E14.12.1 Identify the principles of writing legal descriptions.

E14.12.2 List the parts of a description (caption, body, qualifying clause, and augmenting clause) and typical language of each part.

E14.12.3 Write a description using the procedure outlined in the reference material.

E14.12.4 Define terminology associated with writing legal descriptions.

CRITERION-REFERENCED MEASURE

C14.12 Write legal descriptions of a selected plot of land. Descriptions must match with a recorded description of known accuracy when compared, and all factors on an instructor-prepared checklist must be judged acceptable.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students research the topic of what constitutes a legal description of a plot of land and identify the elements necessary for legal description (E14.12.1-E14.12.4).
2. Share several examples of written legal descriptions with students and have them determine components of each legal description (E14.12.2).
3. Have students prepare a legal description for comparison with a previously recorded description (E14.12.1-E14.12.4).

SELECTED TOOLS AND MATERIALS

Examples of legal descriptions
Instructor-prepared checklist on legal descriptions

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Evidence and Procedures for Boundary Location, Curtis Brown and Winfield Eldridge.

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.13 Convert English measurement units to metric equivalents, and metric equivalents to units

COURSE

Postsecondary

14.13

PERFORMANCE OBJECTIVE

P14.13 Given resources on metric units of measurement and a conversion factor chart, convert English measurement units to metric equivalents, and metric equivalents to units. Acceptable performance will be 90 percent accuracy on all conversions as performed on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E14.13.1 Determine how to read the chart correctly.

E14.13.2 Apply mathematical skills associated with conversion of measurement units.

E14.13.3 Define terminology associated with conversion of measurements.

CRITERION-REFERENCED MEASURE

C14.13 Convert English measurement units to metric equivalents, and metric equivalents to units. Acceptable performance will be 90 percent accuracy on all conversions as performed on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students guess their own height and weight in metric units or guess the height and weight of common objects. Write their estimates on the chalkboard (E14.13.3).
2. Have students use the conversion factor chart to determine the metric equivalent of the English unit, and vice versa (E14.13.1-E14.13.3).
3. Give students a quiz after they have had several trial practices (E14.13.1-E14.13.3).

SELECTED TOOLS AND MATERIALS

Conversion factor chart
Instructor-prepared worksheet on conversion

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Mathematics textbook with conversion chart

CONTENT/CONCEPT

14. SURVEYING LAND

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

14.14 Perform land line location and corner restoration work

COURSE

Postsecondary

14.14

PERFORMANCE OBJECTIVE

P14.14 Given an appropriate example involving land surveying, perform land line location and corner restoration work for an instructor-prepared exercise. Answers must be consistent with those prepared by the instructor and must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E14.14.1 Secure written documents and maps applicable to assignment.

E14.14.2 Run lines and corners according to old surveys.

E14.14.3 Establish lines and corners and compare with instructor's answers.

E14.14.4 Define terminology associated with land line location and corner restoration work.

E14.14.5 Apply mathematical skills associated with land line location and corner restoration work.

CRITERION-REFERENCED MEASURE

C14.14 Perform land line location and corner restoration work for an instructor-prepared exercise. Answers must be consistent with those prepared by the instructor and must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare an exercise calling for the restoration of land lines and corners (P14.14).
2. Have students secure documents relating to tract of land from courthouse or surveyor (E14.14.1).
3. Have students recreate the original survey and restablish land lines and corners for comparison with instructor's answers (E14.14.2-E14.14.5).

SELECTED TOOLS AND MATERIALS

Axe or hammer
Stakes
Surveying equipment
Instructor-prepared exercise on restoration
Instructor-prepared checklist on restoration

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Evidence and Procedures for Boundary Location, Curtis Brown and Winfield Eldridge.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASKS/COMPETENCIES

15.1 Demonstrate ability to paint buildings and equipment

15.2 Clean and sanitize buildings

15.3 Construct fences

15.4 Demonstrate ability to repair roads and driveways

15.5 Demonstrate ability to pour and repair concrete

15.6 Demonstrate ability to build a masonry retaining wall

15.7 Build a stone wall

15.8 Demonstrate knowledge and ability in performing subjourney-level skills in carpentry

15.9 Demonstrate knowledge and ability in performing subjourney-level skills in electricity

15.10 Demonstrate knowledge and ability in performing subjourney-level skills in plumbing

15.11 Maintain and operate water treatment plants, wells, swimming pools, and chlorine systems

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.1 Demonstrate ability to paint buildings and equipment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

15.1

PERFORMANCE OBJECTIVE

P15.1 Given items to be painted, hand or power equipment, and cleaning and masking materials, demonstrate ability to paint buildings and equipment. Surfaces should be cleaned before painting and primed, if needed. Finished paint job should be smooth and without runs, and must receive an acceptable rating according to an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.1.1 Prepare surfaces to be painted by removing dirt, grease, old paint, rust, etc.

E15.1.2 Mask equipment and building interiors, as needed.

E15.1.3 Prime surfaces as required (e.g., metal, new wood).

E15.1.4 Select the correct type of paint coating required.

E15.1.5 Assemble paint equipment required for hand or power application.

E15.1.6 Demonstrate correct operating and application procedures for hand or power equipemnt.

E15.1.7 Remove paint from all areas not to be covered.

E15.1.8 Clean equipment with an appropriate solvent.

E15.1.9 Store paint equipment and supplies.

E15.1.10 Define terminology associated with painting.

CRITERION-REFERENCED MEASURE

C15.1 Demonstrate ability to paint buildings and equipment. Surfaces should be cleaned before painting and primed, if needed. Finished paint job should be smooth and without runs, and must receive an acceptable rating according to an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Present several case study situations to students and have them discuss preparation, masking, and selection of paint and equipment (E15.1.1-E15.1.5).

2. Select several items of equipment and have students prepare and paint the items (P15.1).

3. Have students use the decision-making process in determining how to paint a piece of equipment or a building (E15.1.1-E15.1.10).

SELECTED TOOLS AND MATERIALS

Brushes
Compressed air source
Drop cloths
Emery cloth
Ladder
Masking tape
Paint
Paint gun
Paint stirrer
Paint tray
Respirator
Roller Extension handle
Sandpaper
Screwdriver
Case study situations
Instructor-prepared checklist on painting

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.
Painting Inside and Out, USDA, Science and Education Administration.
Paints & Painting, Vocational Agriculture Service.
Spray Painting, Vocational Agriculture Service.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

15.2 Clean and sanitize buildings

COURSE

Natural Resources Management III
(8040)

15.2

PERFORMANCE OBJECTIVE

P15.2 Given access to an appropriate building, cleaning tools and supplies, clean and sanitize building. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.2.1 Assemble cleaning tools and supplies needed.

E15.2.2 Dust interior of room and furniture.

E15.2.3 Clean walls, partitions, room fixtures, and furniture with water-disinfectant solution, when needed.

E15.2.4 Sweep the room and clean floor with wet mop, when needed.

CRITERION-REFERENCED MEASURE

C15.2 Clean and sanitize buildings. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students review and discuss the procedures of cleaning and sanitizing buildings (E15.2.1-E15.2.4).
2. Have students perform the task and discuss their performance (E15.2.1-E15.2.4).

SELECTED TOOLS AND MATERIALS

Cleaning tools and supplies (mops, brushes, dust cloths, brooms, etc.)
Instructor-prepared checklist on cleaning and sanitizing buildings

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

15.3 Construct fences

COURSE

Natural Resources Management IV
(8042)

15.3

PERFORMANCE OBJECTIVE

P15.3 Given access to suitable landspace and instruction on constructing and maintaining facilities, construct fences. Procedures outlined by the instructor must be followed and an acceptable rating received upon final inspection of the completed fence, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.3.1 Determine need for constructing a fence.

E15.3.2 List types of fences and their usages.

E15.3.3 Calculate number of line posts of appropriate type and size to use.

E15.3.4 Select anchor-post assembly to be used.

E15.3.5 Calculate costs of materials for a specified location.

E15.3.6 List procedures to follow in constructing a particular type of fence (barbed wire, woven wire, electric, cable, welded panel, wood rail, chain link).

CRITERION-REFERENCED MEASURE

C15.3 Construct fences by following procedures outlined by the instructor and receive an acceptable rating upon final insepction of the completed fence, according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select an area that requries fencing and secure permission for the class to assist with construction (E15.3.1-E15.3.6).
2. Have students identify the advantages, disadvantages, and uses of different fencing materials (E15.3.1, E15.3.2).
3. Have students sketch examples of fences found in the local community, including the line post and anchor-post descriptions (E15.3.4, E15.3.5).
4. Review the procedures for constructing a particular type of fence by examining the publication, Building Fences (E15.3.6).
5. Have students design and construct a fence and observe their performance (E15.3.1-E15.3.6).

SELECTED TOOLS AND MATERIALS

Appropriate tools for construction of fence
Instructor-prepared checklist on fence construction

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Building Fences, American Association for Vocational Instructional Materials.
Health and Safety Code Handbook, USDA, Forest Service.
Planning Fences, American Association for Vocational Instructional Materials.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.4 Demonstrate ability to repair roads and driveways

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

15.4

PERFORMANCE OBJECTIVE

P15.4 Given a shovel, tamper, and the necessary fill materials, demonstrate ability to repair roads and driveways. Asphalt, concrete, or gravel are to be used as the road and driveway surface. The repair must support an automobile without losing the shape of the repair, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.4.1 Locate sunken areas or potholes.

E15.4.2 Remove broken asphalt, concrete, and other faulty base materials from roadbed.

E15.4.3 Place a mixture of clay in roadbed and compact in 6" layers. Compact to within 8" of roadway surface.

E15.4.4 Follow instructions of supplier for placing asphalt, concrete, or gravel in the roadway.

E15.4.5 Evaluate roadway to determine strength of repair.

CRITERION-REFERENCED MEASURE

C15.4 Demonstrate ability to repair roads and driveways using asphalt, concrete, or gravel as the surface. The repair must support an automobile without losing the shape of the repair. Performance must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Select a site requiring the repair of roads or driveways (P15.4).
2. Have students remove cracked, crumbly, or loose materials (E15.4.1, E15.4.2).
3. Have students prepare surface that is being patched to receive patching materials (E15.4.3, E15.4.4).
4. Have students apply the patching material and observe quality of work performed (E15.4.4, E15.4.5).

SELECTED TOOLS AND MATERIALS

Shovel
Tamper
Fill materials (clay, asphalt, concrete, gravel)
Instructor-prepared checklist on repairing roads

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Concrete Improvements for Farm and Home, Vocational Agriculture Service.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

TASK/COMPETENCY

15.5 Demonstrate ability to pour and repair concrete

COURSE

Natural Resources Management IV (8042)

15.5

PERFORMANCE OBJECTIVE

P15.5 Given necessary tools and material, demonstrate ability to pour and repair concrete. The instructor must rate the finished job acceptable, using an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.5.1 Select materials, tools, and equipment needed to prepare and pour concrete.

E15.5.2 Determine usage of concrete; mixture ratios and quantities of cement, sand, and gravel required.

E15.5.3 Prepare or construct forms, if needed.

E15.5.4 Mix materials by hand or machine.

E15.5.5 Spread concrete in form using a shovel, board, or vibrator.

E15.5.6 Finish and cure the concrete properly.

E15.5.7 Remove forms and repair cracks or holes.

E15.5.8 Apply mathematical skills associated with pouring concrete.

CRITERION-REFERENCED MEASURE

C15.5 Demonstrate ability to pour and repair concrete. Acceptable performance must receive an acceptable rating on an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students identify the usages of concrete in the local community. Have them determine the need for various strengths of concrete due to its application (E15.5.2).
2. Select a project requiring the pouring of concrete and have students perform this task (E15.5.1-E15.5.7).
3. Evaluate the performance of each students using a checklist that describes the process to follow and the product to be developed (E15.5.1-E15.5.8).

SELECTED TOOLS AND MATERIALS

Cement
Floats
Gravel
Hammer & nails
Hoe
Level
Lumber for forms
Mixing pan
Sand
Screed (board)
String, stakes
Trowels
Instructor-prepared checklist on concrete repair

SELECTED AUDIOVISUAL MATERIALS

Slides: (1) Concrete Masonry, and (2) Mr. Quality Concrete, Ohio Agricultural Education Curriculum Materials Service.

SELECTED REFERENCES

Teaching Materials:
Concrete Improvements for Farm and Home, Vocational Agriculture Service.
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.6 Demonstrate ability to build a masonry retaining wall

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

15.6

PERFORMANCE OBJECTIVE

P15.6 Given masonry tools, equipment, and supplies, demonstrate ability to build a masonry retaining wall. The wall must meet the finish standards of an employed professional.

SELECTED ENABLING OBJECTIVES

E15.6.1 Lay out footing, using batter boards and string.

E15.6.2 Dig footing trench to desired depth.

E15.6.3 Set stakes to show depth of concrete.

E15.6.4 Pour concrete in trench to desired footing level.

E15.6.5 Assemble masonry tools, equipment, and supplies.

E15.6.6 Mix mortar.

E15.6.7 Apply mortar to blocks or brick with trowel.

E15.6.8 Set block in place, using established procedures for laying walls.

E15.6.9 Smooth mortar joints with mortar joint tool.

E15.6.10 Clean and store tools, equipment, and supplies.

E15.6.11 Clean wall to remove excess mortar.

E15.6.12 Define terminology associated with masonry.

E15.6.13 Apply mathematical skills associated with building a masonry retaining wall.

CRITERION-REFERENCED MEASURE

C15.6 Demonstrate ability to build a masonry retaining wall. The wall must meet the finish standards of an employed professional

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine the local community to determine sites requiring a masonry retaining wall (E15.6.1-E15.6.13).

2. Select one of these sites from abcve and have students build the needed retaining wall (E15.6.1-E15.6.13).

3. Discuss the procedures to be followed for each enabling objective and question students about why something is peformed in a particular way (E15.6.1-E15.6.13).

SELECTED TOOLS AND MATERIALS

Cement
Floats
Gravel
Hammer & nails
Hoe
Level
Lumber for forms
Masonry block
Mixing pan
Sand
String, stakes
Trowels

SELECTED AUDIOVISUAL MATERIALS

Slides: Concrete Masonry, Ohio Agricultural Education Curriculum Materials Service.

SELECTED REFERENCES

Teaching Materials:
Concrete Improvements for Farm and Home, Vocational Agriculture Service.
Recommended Practices for Building with Concrete Masonry, Vocational Agriculture Service.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.7 Build a stone wall

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

15.7

PERFORMANCE OBJECTIVE

P15.7 Given masonry tools, equipment, and supplies, build a stone wall. Performance must be rated acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.7.1 Lay out footing, using batter boards and string.

E15.7.2 Dig footer trench to desired depth.

E15.7.3 Set stakes to show depth of concrete.

E15.7.4 Pour concrete in trench to desired footing level.

E15.7.5 Assemble masonry tools, equipment, and supplies.

E15.7.6 Mix mortar.

E15.7.7 Apply mortar to stones and joints with trowel.

E15.7.8 Set stones in place using strings attached to the batter boards as guides.

E15.7.9 Smooth mortar joints with mortar joint tool, if a smooth joint effect is desired.

E15.7.10 Clean and store tools, equipment, and supplies.

E15.7.11 Clean stones with water-muriatic acid solution.

E15.7.12 Define terminology associated with building a stone wall.

E15.7.13 Apply mathematical skills associated with building a stone wall.

CRITERION-REFERENCED MEASURE

C15.7 Build a stone wall and receive an acceptable rating according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine the local community to determine sites suitable for a stone wall (E15.7.1-E15.7.13).
2. Select one of these sites and have students build a stone wall (E15.7.1-E15.7.13).
3. Discuss the procedures to be followed for each enabling objective and question students about why something is peformed in a particular way (E15.7.1-E15.7.13).

SELECTED TOOLS AND MATERIALS

Floats
Hammer & nails
Lumber for forms
Mixing pan
Mortar mix
String, stakes
Trowels
Instructor-prepared checklist on building a stone wall

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

PROGRAM

AGRICULTURAL RESOURCES (03.0101).

TASK/COMPETENCY

15.8 Demonstrate knowledge and ability in performing subjourney-level skills in carpentry

COURSE

Natural Resources Management V (8044)

15.8

PERFORMANCE OBJECTIVE

P15.8 Given necessary tools and appropriate jobs, demonstrate knowledge and ability in performing subjourney-level skills in carpentry. An acceptable rating must be achieved on written and performance checklists developed by the instructor.

SELECTED ENABLING OBJECTIVES

E15.8.1 Identify simple hand and power tools of the carpenter.

E15.8.2 Describe function of each hand and power tool.

E15.8.3 Demonstrate ability to perform basic skills such as measuring, using squares and levels, sawing, drilling, hammering, filing, and fastening.

E15.8.4 Demonstrate knowledge of performing more advanced carpentry skills assigned by the instructor.

CRITERION-REFERENCED MEASURE

C15.8 Demonstrate knowledge and ability in performing subjourney-level skills in carpentry. An acceptable rating must be achieved on written and performance checklists developed by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students study reference materials if needed in order to be able to identify and describe function of each tool (E15.8.1, E15.8.2).

2. Devise a series of written and performance tests for each student to complete, arranged in order of complexity of skill to be developed (E15.8.3, E15.8.4).

3. Have students construct an outdoor recreation structure that incorporates needed carpentry skills (E15.8.1-E15.8.4).

SELECTED TOOLS AND MATERIALS

Chisels
Circular saw
Electric drill
Fasteners
Files and rasps
Grinder
Hammers
Level
Pliers and cutters
Saber saw
Saws
Screwdrivers
Square
Tape measure
Wrenches
Instructor-prepared checklists on carpentry skills

SELECTED AUDIOVISUAL MATERIALS

Note: Tool Identification Manual contains illustrations (see selected references below).

SELECTED REFERENCES

Teaching Materials:
Build Recreation Structures From Low-Grade Hardwoods, USDA, Forest Service.
The Illustrated Tool Identification Manual, Vocational Education Productions.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.9 Demonstrate knowledge and ability in performing subjourney-level skills in electricity

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

15.9

PERFORMANCE OBJECTIVE

P15.9 Given necessary tools and appropriate jobs, demonstrate knowledge and ability in performing journey-level skills in electricity. An acceptable rating must be achieved on written and performance checklists developed by the instructor.

SELECTED ENABLING OBJECTIVES

E15.9.1 Identify simple hand and power tools of the electrician.

E15.9.2 Describe function of each hand and power tool.

E15.9.3 Demonstrate ability to perform basic skills such as measuring, sawing, drilling, installing switches and wiring, stripping and connecting wires, and using neon testers.

E15.9.4 Demonstrate knowledge of performing more advanced electrical skills assigned by the instructor.

CRITERION-REFERENCED MEASURE

C15.9 Demonstrate knowledge and ability in performing journey-level skills in electricity. An acceptable rating must be achieved on written and performance checklists developed by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students study reference materials if needed in order to be able to identify and describe function of each tool (E15.9.1).
2. Devise a series of written and performance tests for each student to complete arranged in order of complexity of skill to be developed (E15.9.3, E15.9.4).
3. Have students rewire or install new wiring in an outdoor recreation structure incorporating the electrical skills learned (E15.9.1-E15.9.4).

SELECTED TOOLS AND MATERIALS

Chisels
Circular saw
Electric drill
Electrical fixtures, switches, receptacles
Fasteners
Hammers
Level
Pliers and cutters
Saws
Screwdrivers
Square
Tape measure
Wire
Wire nuts
Wrenches
Instructor-prepared checklists on electrical skills

SELECTED AUDIOVISUAL MATERIALS

Slides or Filmstrips: (1) Electrical Wiring and (2) Understanding Electricity and Electrical Terms, American Association for Vocational Instructional Materials.

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.
Maintaining the Lighting and Wiring System, American Association for Vocational Instructional Materials.
Understanding Electricity and Electrical Terms, American Association for Vocational Instructional Materials.

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.10 Demonstrate knowledge and ability in performing subjourney-level skills in plumbing

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

15.10

PERFORMANCE OBJECTIVE

P15.10 Given necessary tools and appropriate jobs, demonstrate knowledge and ability in performing subjourney-level skills in plumbing. An acceptable rating must be achieved on written and performance checklists developed by the instructor.

SELECTED ENABLING OBJECTIVES

E15.10.1 Identify simple hand and power tools of the plumber.

E15.10.2 Describe function of each hand and power tool.

E15.10.3 Demonstrate ability to perform basic skills such as measuring, using squares and levels, sawing, drilling, filing, cutting, reaming, threading, and installing and repairing pipe and fixtures.

E15.10.4 Demonstrate knowledge of performing more advanced plumbing skills assigned by the instructor.

CRITERION-REFERENCED MEASURE

C15.10 Demonstrate knowledge and ability in performing subjourney-level skills in plumbing. An acceptable rating must be achieved on written and performance checklists developed by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students study reference materials if needed in order to be able to identify and describe function of each tool (E15.10.1, E15.10.2).

2. Devise a series of written and performance tests for each student to complete arranged in order of complexity of skill to be developed (E15.10.3, E15.10.4).

3. Have students perform needed plumbing skills for an outdoor recreation structure (E15.10.1-E15.10.4).

SELECTED TOOLS AND MATERIALS

Chisels
Dies
Drain cleaners
Fasteners
Files and reamers
Hammers
Joint compound
Level
Packing or caulking
Pipe
Pipe wrenches
Pliers and cutters
Plumbing fixtures
Plunger
Power hacksaw
Saws
Screwdrivers
Snake
Square
Tape measure
Washers
Instructor-prepared checklists on plumbing skills

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

15. CONSTRUCTING AND MAINTAINING FACILITIES

TASK/COMPETENCY

15.11 Maintain and operate water treatment plants, wells, swimming pools, and chlorine systems

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Postsecondary

15.11

PERFORMANCE OBJECTIVE

P15.11 Given access to appropriate facilities, maintain and operate water treatment plants, wells, swimming pools, and chlorine systems. Perform all maintenance and operation tasks assigned to an acceptable level of performance, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E15.11.1 Complete all forms and reports related to tasks assigned.

E15.11.2 Inspect equipment, tools, piping, gauges, and instruments as assigned.

E15.11.3 Perform necessary cleaning operations.

E15.11.4 Demonstrate appropriate service and maintenance functions.

E15.11.5 Conduct required chemical tests and treatments.

CRITERION-REFERENCED MEASURE

C15.11 Maintain and operate water treatment plants, wells, swimming pools, and chlorine systems. Perform all maintenance and operation tasks assigned to an acceptable level of performance, according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students visit and observe the operation of water treatment plants, wells, swimming pools, and chlorine systems (E15.11.1-E15.11.5).
2. Have students perform selected tasks at these sites under instructor supervision (E15.11.1-E15.11.5).
3. Discuss safety precautions to be observed at these work sites (E15.11.2-E15.11.5).
4. Invite operators to come to class to discuss their job duties with the class (E15.11.1-E15.11.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared checklist on maintenance and operation of facilities

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.
Planning for an Individual Water System, American Association for Vocational Instructional Materials.

CONTENT/CONCEPT

16. OPERATING VEHICLES AND EQUIPMENT

TASKS/COMPETENCIES

16.1 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management III

16.2 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management IV

16.3 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management V

16.4 Demonstrate ability to operate vehicles and equipment applicable to the postsecondary natural resources management program

CONTENT/CONCEPT

16. OPERATING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

16.1 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management III

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

16.1

PERFORMANCE OBJECTIVE

P16.1 Given specific instruction on operating vehicles and equipment, demonstrate ability to operate the vehicles and equipment applicable to Natural Resources Management III. Acceptable performance will be achieved when the vehicle or equipment listed in C16.1 is operated according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E16.1.1 Explain general safety rules for operating vehicles and equipment.

E16.1.2 Demonstrate knowledge of operator's manual, especially noting safety precautions.

E16.1.3 Describe starting procedures and operating controls for the vehicles and equipment.

E16.1.4 Determine proper and improper functioning of the vehicle or equipment.

E16.1.5 Perform necessary adjustments under field conditions to ensure proper functioning.

E16.1.6 Determine capabilities of each vehicle or piece of equipment.

E16.1.7 Identify specific safety rules for operating the vehicle or equipment.

E16.1.8 Define terminology associated with operation of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C16.1 Demonstrate ability to operate vehicles or equipment according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: camera, hand and portable power tools, lawn roller, reel-type mower, rotary tiller, and rotary-type mower.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a general list of safety rules for operating vehicles and equipment (E16.1.1).
2. Secure copies of operator's manuals for each vehicle or piece of equipment studied (E16.1.2).
3. Discuss procedures for vehicle and equipment operation (E16.1.2-E16.1.8).
4. Present a certificate at the end of the year to each student, indicating which vehicles or pieces of equipment have been successfully operated (E16.1.1-E16.1.8).

Note: The operation of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
Camera
Hand and portable tools
Lawn roller
Reel-type mower
Rotary tiller
Rotary-type mower

SELECTED AUDIOVISUAL MATERIALS

Slides or filmstrips: Developing Shop Safety Skills, American Association for Vocational Instructional Materials.

SELECTED REFERENCES

Teaching Materials:
Groundskeeping Equipment, American Association for Vocational Instructional Materials.
Handbook for Eastern Timber Harvesting, pp. 13-21, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.
The Illustrated Tool Identification Manual, Vocational Education Productions.
Safety in the Agricultural Mechanics Shop, Vocational Agriculture Service.

CONTENT/CONCEPT

16. OPERATING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

16.2 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management IV

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

16.2

PERFORMANCE OBJECTIVE

P16.2 Given specific instructions on operating vehicles and equipment, demonstrate ability to operate the vehicles and equipment applicable to Natural Resources Management IV. Acceptable performance will be achieved when each vehicle or piece of equipment listed in C16.2 is operated according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E16.2.1 Explain general safety rules for operating vehicles and equipment.

E16.2.2 Demonstrate knowledge of operator's manual, especially noting safety precautions.

E16.2.3 Describe starting procedures and operating controls for the vehicles and equipment.

E16.2.4 Determine proper and improper functioning of the vehicle or equipment.

E16.2.5 Perform necessary adjustments under field conditions to ensure proper functioning.

E16.2.6 Determine capabilities of each vehicle or piece of equipment.

E16.2.7 Identify specific safety rules for operating the vehicle or equipment.

E16.2.8 Define terminology associated with operation of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C16.2 Demonstrate ability to operate vehicles or equipment according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: air compressor, battery charger, electric welder, farm tractor, high pressure washer, oxy-acetylene torch, pickup truck, post driver, power rake, power scythe, steam cleaner, vacuum rake, and weed cutter.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a general list of safety rules for operating vehicles and equipment (E16.2.1).

2. Secure copies of operator's manuals for each vehicle or piece of equipment studied (E16.2.2).

3. Discuss procedures for vehicle and equipment operation (E16.2.2-E16.2.8).

4. Present a certificate at the end of the year to each student indicating which vehicles or pieces of equipment have been successfully operated (E16.2.1-E16.2.8).

Note: The operation of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
Air compressor
Battery charger
Electric welder
Farm tractor
High pressure washer
Oxy-acetylene torch
Pickup truck
Post drive
Power rake
Power scythe
Steam cleaner
Vacuum rake
Weed cutter

SELECTED AUDIOVISUAL MATERIALS

Filmstrips: (1) Oxy-Acetylene Welding: Setting Up the Equipment (2) Oxy-Acetylene Welding: Flat Position Welds, Oxy-Acetylene Welding Kit, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.
Safe Tractor Operation and Daily Care, American Association for Vocational Instructional Materials.

CONTENT/CONCEPT

16. OPERATING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

16.3 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management V

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

16.3

PERFORMANCE OBJECTIVE

P16.3 Given specific instruction on operating vehicles and equipment, demonstrate ability to operate the vehicles and equipment applicable to Natural Resources Management V. Acceptable performance will be achieved when the vehicles or equipment listed in C16.3 are operated according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E16.3.1 Explain general safety rules for operating vehicles and equipment.

E16.3.2 Demonstrate knowledge of operator's manual, especially noting safety precautions.

E16.3.3 Describe starting procedures and operating controls for the vehicles and equipment.

E16.3.4 Determine proper and improper functioning of the vehicle or equipment.

E16.3.5 Perform necessary adjustments under field conditions to ensure proper functioning.

E16.3.6 Determine capabilities of each vehicle or piece of equipment.

E16.3.7 Identify specific safety rules for operating the vehicle or equipment.

E16.3.8 Define terminology associated with operation of equipment.

CRITERION-REFERENCED MEASURE

C16.3 Demonstrate ability to operate vehicles or equipment according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: chain saw and other appropriate tree harvesting equipment.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a general list of safety rules for operating vehicles and equipment (E16.3.1).

2. Secure copies of operator's manuals for each vehicle or piece of equipment studied (E16.3.2).

3. Discuss procedures for vehicle and equipment operation (E16.3.2-E16.3.8).

4. Present a certificate at the end of the year to each student indicating which vehicles or pieces of equipment have been successfully operated (16.3.1-E16.3.8).

Note: The operation of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
Chain saw

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: The Chain Saw and Other Harvesting Tools, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Chain Saw Training Guide, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, pp. 3-12, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.

Application

CONTENT/CONCEPT

16. OPERATING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

16.4 Demonstrate ability to operate vehicles and equipment applicable to the postsecondary natural resources management program

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Postsecondary

16.4

PERFORMANCE OBJECTIVE

P16.4 Given specific instruction on operating vehicles and equipment, demonstrate ability to operate the vehicles and equipment applicable to the postsecondary natural resources management program. Acceptable performance will be achieved when each vehicle or piece of equipment listed in C16.4 is operated according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E16.4.1 Explain general safety rules for operating vehicles and equipment.

E16.4.2 Demonstrate knowledge of operator's manual, especially noting safety precuations.

E16.4.3 Describe starting procedures and operating controls for the vehicles and equipment.

E16.4.4 Determine proper and improper functioning of the vehicle or equipment.

E16.4.5 Perform necessary adjustments under field conditions to ensure proper functioning.

E16.4.6 Determine capabilities of each vehicle or piece of equipment.

E16.4.7 Define terminology associated with operation of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C16.4 Demonstrate ability to operate vehicles or equipment according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: "Big Stick" loader; boats; bulldozer; bush log crane; cut-off saw; debarker; drop-type hopper fertilizer spreader; edger; front-end loader; game farm and wildlife equipment; knuckle-boom loader; large trucks; log conveyor; lumber grader; mechanical fish-sorting device; motor grader; planer; power edger; quad saw; resaw; separator; skidder; sorter tender; stacker; tractor-mounted sprayer; trimmer mill; trimmer planer; truck scales; and winch.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a general list of safety rules for operating vehicles and equipment (E16.4.1).

2. Secure copies of operator's manuals for each vehicle or piece of equipment studies (E16.4.2).

3. Discuss procedures for vehicle and equipment operation (E16.4.2-E16.4.7).

4. Present a certificate at the end of the year to each student indicating which vehicles or pieces of equipment have been successfully operated (E16.4.1-E16.4.7).

Note: The operation of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
"Big Stick" loader
Boats
Bulldozer
Bush log crane
Cut-off saw
Debarker
Drop-type hopper fertilizer spreader
Edger
Front-end loader
Game farm and wildlife equipment
Knuckle-boom loader
Large trucks
Log conveyor
Lumber grader
Mechanical fish-sorting device
Motor grader
Planer
Power edger
Quad saw
Resaw
Separator
Skidder
Sorter tender
Stacker
Tractor-mounted sprayer
Trimmer mill
Trimmer planer
Truck scales
Winch

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, pp. 63-74, pp. 99-120, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

TASKS/COMPETENCIES

17.1 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management III

17.2 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management IV

17.3 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management V

17.4 Service various types of equipment drives

17.5 Attach accessory equipment to basic power unit

17.6 Demonstrate ability to maintain vehicles and equipment applicable to the postsecondary natural resources management program

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

17.1 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management III

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

17.1

PERFORMANCE OBJECTIVE

P17.1 Given access to various vehicles and equipment, demonstrate ability to maintain the vehicles and equipment applicable to Natural Resources Management III. Acceptable performance will be achieved when each vehicle or piece of equipment listed in C17.1 is maintained according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E17.1.1 Identify general safety rules for maintaining vehicles and equipment.

E17,1.2 Demonstrate knowledge of operator's manual, especially noting maintenance equipment.

E17.1.3 Describe maintenance procedures for the vehicle or equipment.

E17.1.4 Secure supplies or parts needed to maintain vehicles or equipment.

E17.1.5 Perform daily, weekly, bi-weekly, quarterly, semi-annual, and annual maintenance requirements of vehicle or equipment.

E17.1.6 Identify specific safety rules while maintaining the vehicle or equipment.

E17.1.7 Define terminology associated with maintenance of vehicles and equipment.

E17.1.8 Apply mathematical skills associated with maintenance of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C17.1 Demonstrate ability to maintain the vehicles and equipment applicable to Natural Resources Management III according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: camera, hand and portable power tools, lawn roller, reel-type mower, rotary tiller, and rotary-type mower.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the need for maintenance of vehicles and equipment with students (E17.1.2).
2. Have students read the operator's manual for each vehicle or piece of equipment and note the maintenance schedule (E17.1.2-E17.1.8).
3. Have students perform the maintenance tasks for vehicles and equipment (E17.1.1-E17.1.8).

Note: The maintenance of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

operator's manuals with applications
camera
hand and portable power tools
lawn roller
reel-type mower
rotary tiller
rotary-type mower

SELECTED AUDIOVISUAL MATERIALS

Slides or filmstrips: Developing Shop Safety Skills, American Association for Vocational Instructional Materials

SELECTED REFERENCES

Teaching Materials:
Groundskeeping Equipment, American Association for Vocational Instructional Materials
Health and Safety Code Handbook, USDA, Forest Service.
The Illustrated Tool Identification Manual, Vocational Education Productions.
Safety in the Agricultural Mechanics Shop, Vocational Agriculture Service.

Application

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

17.2 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management IV

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

17.2

PERFORMANCE OBJECTIVE

P17.2 Given access to various vehicles and equipment, demonstrate ability to maintain the vehicles and equipment applicable to Natural Resources Management IV. Acceptable performance will be achieved when each vehicle or piece of equipment listed in C17.2 is operated according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E17.2.1 Identify general safety rules for maintaining vehicles and equipment.

E17.2.2 Demonstrate knowledge of operator's manual, especially noting maintenance requirements.

E17.2.3 Describe maintenance procedures for the vehicle or equipment.

E17.2.4 Secure supplies or parts needed to maintain vehicle or equipment.

E17.2.5 Perform daily, weekly, bi-weekly, quarterly, semi-annual, and annual maintenance requirements of vehicle or equipment.

E17.2.6 Identify specific safety rules while maintaining the vehicle or equipment.

E17.2.7 Define terminology associated with maintenance of vehicles and equipment.

E17.2.8 Apply mathematical skills associated with maintenance of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C17.2 Demonstrate ability to maintain the vehicles and equipment applicable to Natural Resources Management IV according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: air compressor, battery charger, boat, electric motor, electric welder, fish tank, high pressure washer, oxy-acetylene torch, post driver, power rake, power scythe, rotary blade grinder-balancer, small engine, steam cleaner, vacuum rake, water softener, and weed cutter.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the need for maintenance of vehicles and equipment with students (E17.2.2).

2. Have students read the operator's manual for each vehicle or piece of equipment and note the maintenance schedule (E17.2.2-E17.2.8).

3. Have students perform the maintenance tasks for vehicles and equipment (E17.2.1-E17.2.8).

Note: The maintenance of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
Air compressor
Battery charger
Boat
Electric motor
Electric welder
Fish tank
High pressure washer
Oxy-acetylene torch
Post driver
Power rake
Power scythe
Rotary blade grinder-balancer
Small engine
Steam cleaner
Vacuum rake
Water softener
Weed cutter

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

17.3 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management V

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

17.3

PERFORMANCE OBJECTIVE

P17.3 Given access to various vehicles and equipment, demonstrate ability to maintain the vehicles and equipment applicable to Natural Resources Management V. Acceptable performance will be achieved when each vehicle or piece of equipment listed in C17.3 is maintained according to manufacturer's specifications, as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E17.3.1 Identify general safety rules for maintaining vehicles and equipment.

E17.3.2 Demonstrate knowledge of operator's manual, especially noting maintenance requirements.

E17.3.3 Describe maintenance procedures for the vehicles or equipment.

E17.3.4 Secure supplies or parts needed to maintain vehicle or equipment.

E17.3.5 Perform daily, weekly, bi-weekly, quarterly, semi-annual, and annual maintenance requirements of vehicle or equipment.

E17.3.6 Identify specific safety rules while maintaining the vehicle or equipment.

E17.3.7 Define terminology associated with maintenance of vehicles and equipment.

E17.3.8 Apply mathematical skills associated with maintenance of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C17.3 Demonstrate ability to maintain the vehicles and equipment applicable to Natural Resources Management V according to the manufacturer's specifications as evaluated by the instructor. The following vehicles and equipment should be used: chain saws, farm tractor, irrigation lines and spray components, trucks, winch, and wire rope.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the need for maintenance of vehicles and equipment with students (E17.3.2).
2. Have students read the operator's manual for each vehicle or piece of equipment and note the maintenance schedule (E17.3.2-E17.3.8).
3. Have students perform the maintenance tasks for vehicles and equipment (E17.3.1-E17.3.8).

Note: The maintenance of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
Chain saws
Farm tractor
Irrigation lines and spray components
Trucks
Winch
Wire rope

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: The Chain Saw and Other Harvesting Tools, Vocational Education Production

SELECTED REFERENCES

Teaching Materials:
Handbook for Eastern Timber Harvesting, pp. 9-11, 74, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.
Safe Tractor Operation and Daily Care, American Association for Vocational Instructional Materials.

Application

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

17.4 Service various types of equipment drives

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

17.4

PERFORMANCE OBJECTIVE

P17.4 Given access to various vehicles and equipment, operator's manuals, solvents, lubricants, and needed tools, service the equipment drives listed in C17.4. Acceptable performance will be following the manufacturer's specifications for servicing as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E17.4.1 Identify basic types of belts, chains, gears, and their application in equipment drives.

E17.4.2 Inspect components of equipment drives for wear, improper installation, alignment, tension, etc.

E17.4.3 Clean components of equipment drives with proper solvent.

E17.4.4 Lubricate equipment drives.

E17.4.5 Adjust belts, chains, gears, sprockets to manufacturer's specifications.

E17.4.6 Examine equipment to determine if all safety shields are in place.

E17.4.7 Define terminology associated with servicing equipment drives.

E17.4.8 Apply mathematical skills associated with servicing equipment drives.

CRITERION-REFERENCED MEASURE

C17.4 Service the following equipment drives: belt, chain, gear, and variable speed. Acceptable performance will be following the manufacturer's specifications for servicing as evaluated by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students identify the belts, chains, and gears used in equipment drives (E17.4.1).

2. Provide students with several examples of worn equipment drives and have them diagnose the cause and describe how to repair the drive (E17.4.2-E17.4.6).

3. Demonstrate methods used to service equipment drives (E17.4.1-E17.4.8).

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
Solvents
Lubricants
Belt
Chain
Gear
Variable speed equipment drive

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Groundskeeping Equipment, American Association for Vocational Instructional Materials.

Application

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

TASK/COMPETENCY

17.5 Attach accessory equipment to basic power unit

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

17. 5

PERFORMANCE OBJECTIVE

P17.5 Given instruction on operating equipment, attach accessory equipment to basic power unit in sequence given by the manufacturer. Acceptable performance will be following hookup procedures outlined in manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E17.5.1 Determine sequence of hookup by reading in operator's manual.

E17.5.2 Describe general and specific safety precautions to observe in attaching accessory equipment.

E17.5.3 Perform the physical operations required to attach the accessory equipment.

E17.5.4 Determine if accessory equipment is properly attached.

E17.5.5 Determine whether accessory equipment remains properly attached.

E17.5.6 Define terminology associated with attaching accessory equipment.

CRITERION-REFERENCED MEASURE

C17.5 Attach accessory equipment to basic power unit in sequence given by the manufacturer. Acceptable performance will be following hookup procedures outlined in manufacturer's specifications as evaluated by the instructor.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Secure several pieces of accessory equipment for attachment to the power unit. Have students orally describe how to attach the accessories, especially noting safety precautions to be followed (E17.5.1-E17.5.6).

2. Demonstrate to students how to perform the task of attaching accessory equipment, explaining safety procedures (E17.5.1-E17.5.6).

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Groundskeeping Equipment, American Association for Vocational Instructional Materials.

Application

CONTENT/CONCEPT

17. MAINTAINING VEHICLES AND EQUIPMENT

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

17.6 Demonstrate ability to maintain vehicles and equipment applicable to the postsecondary Natural Resources Management program

COURSE

Postsecondary

17.6

PERFORMANCE OBJECTIVE

P17.6 Given access to various vehicles and equipment, demonstrate ability to maintain the vehicles and equipment applicable to postsecondary natural resources management program. Acceptable performance will be achieved when each vehicle or piece of equipment listed in C17.6 is maintained according to manufacturer's specifications as evaluated by the instructor.

SELECTED ENABLING OBJECTIVES

E17.6.1 Identify general safety rules for maintaining vehicles and equipment.

E17.6.2 Demonstrate knowledge of operator's manual, especially noting maintenance requirements.

E17.6.3 Describe maintenance procedures for the vehicle or equipment.

E17.6.4 Secure supplies or parts needed to maintain vehicle or equipment.

E17.6.5 Perform daily, weekly, bi-weekly, quarterly, semi-annual, and annual maintenance requirement of vehicle or equipment.

E17.6.6 Identify specific safety rules while maintaining the vehicle or equipment.

E17.6.7 Define terminology associated with maintenance of vehicles and equipment.

E17.6.8 Apply mathematical skills associated with maintenance of vehicles and equipment.

CRITERION-REFERENCED MEASURE

C17.6 Demonstrate ability to maintain the vehicles and equipment applicable to postsecondary natural resources management program according to manufacturer's specifications, as evaluated by the instructor. The following vehicles and equipment should be used: "Big Stick" loader, bulldozer, bush log crane, cut-off saw, debarker, drop-type hopper fertilizer spreader, edger, fire fighting equipment, front-end loader, game farm and wildlife equipment, knuckle-boom loader, large trucks, log conveyor, lumber grader, mechanical fish-sorting device, motor grader, planer, power edger, quad saw, resaw, separator, skidder, sorter tender, stacker, tractor-mounted sprayer, trimmer mill, trimmer planer, and truck scales.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss the need for maintenance of vehicles and equipment (E17.6.2).

2. Have students read the operator's manual for each vehicle or piece of equipment and note the maintenance schedule (E17.6.2-E17.6.8).

3. Have students perform the maintenance tasks for vehicles and equipment (E17.6.1-E17.6.8).

Note: The maintenance of vehicles and equipment could be taught throughout the school year as the task to which it relates is taught, rather than being taught as a separate unit.

SELECTED TOOLS AND MATERIALS

Operator's manuals with specifications
"Big Stick" loader
Bulldozer
Bush log crane
Cut-off saw
Debarker
Drop-type hopper fertilizer spreader
Edger
Fire fighting equipment
Front-end loader
Game farm and wildlife equipment
Knuckle-boom loader
Large trucks
Log conveyor
Lumber grader
Mechanical fish-sorting device
Motor grader
Planner
Power edger
Quad saw
Resaw
Separator
Skidder
Sorter tender
Stacker
Tractor-mounted sprayer
Trimmer mill
Trimmer planner
Truck scales

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Equipmentfor Reforestation and Timber Stand Improvement, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, pp. 63-74, 99-120, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASKS/COMPETENCIES

18.1 Water Plants

18.2 Aerate sod

18.3 Haul and spread topsoil

18.4 Prepare and apply a compost

18.5 Sterilize soil

18.6 Add mulch to new seedlings

18.7 Check plants for insects

18.8 Remove weeds and grasses from flower bed

18.9 Plant annual flowers

18.10 Plant flower bulbs

18.11 Wrap trees or shrubs to protect from weather

18.12 Compile information necessary for purchasing chemicals for a specific use

18.13 Apply chemical treatment to diseased plants

18.14 Apply chemical treatment to insect-infested plants

18.15 Apply weed-killing compounds to lawns

18.16 Prune and trim trees

18.17 Develop fertilization schedules

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.1 Water plants

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.1

PERFORMANCE OBJECTIVE

P18.1 Given access to groups of indoor and outdoor plants, irrigation equipment, and moisture testing device, water plants so that adequate moisture is provided. Acceptable performance will be maintaining even plant growth throughout the growing season.

SELECTED ENABLING OBJECTIVES

E18.1.1 Determine amount of water needed by groups of plants.

E18.1.2 Determine soil type and slope for outdoor plants and potting media for indoor plants.

E18.1.3 Check to see if plants are established or newly planted.

E18.1.4 Check equipment for proper operation.

E18.1.5 Set up watering equipment and determine coverage for outdoor applications. Use watering can or hose for indoor application.

E18.1.6 Regulate water flow or application so that adequate coverage is obtained--6" to 8" depth for outdoor applications and water flowing through the drainage hole(s) of pots in indoor applications.

E18.1.7 Examine plants, soil moisture conditions, and weather conditions to determine watering schedule.

E18.1.8 Apply mathematical skills associated with watering plants.

CRITERION-REFERENCED MEASURE

C18.1 Water plants found in indoor and outdoor settings so that adequate moisture is provided. Acceptable performance will be maintaining even plant growth throughout the growing season.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students list all the factors that influence the total amount of water needed by plants in different settings (E18.1.1-E18.1.3).

2. Arrange for students to visit parks, greenhouses, irrigated croplands, or other situations where plants are watered to determine how to water plants (E18.1.1-E18.1.8).

3. Set up test plots and vary the amounts of water applied to determine the effect upon plant growth (E18.1.17).

SELECTED TOOLS AND MATERIALS

Irrigation equipment (hose, sprinkler, watering can)
Moisture testing device

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
The Nursery Worker, Ohio Agricultural Education Curriculum Materials Service.

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.2 Aerate sod

—— Application ——

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.2

PERFORMANCE OBJECTIVE

P18.2 Given access to a compacted lawn and an aerator, aerate soil, using manual or powered equipment according to manufacturer's specifications.

SELECTED ENABLING OBJECTIVES

E17.2.1 Demonstrate knowledge of operator's manual regarding instructions for usage of equipment.

E18.2.2 Determine direction of travel for equipment.

E18.2.3 Aerate entire area that is compacted.

E18.2.4 Clean and repair tines, as necessary.

E18.2.5 Define terminology associated with aerating sod.

CRITERION-REFERENCED MEASURE

C18.2 Aerate soil, using manual or powered equipment according to manufacturer's specifications.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Examine compacted sod to determine effect upon grass, water, and soil structure and texture (E18.2.5).
2. Have student gather literature from manufacturers of aerators and discuss the advantages and disadvantages of each aerator (E18.2.1).
3. Discuss how to determine direction of travel for equipment (E18.2.2).
4. Explain necessity of keeping tines cleaned and repaired (E18.2.4).
5. Demonstrate method of aerating compacted sod (E18.2.3).

SELECTED TOOLS AND MATERIALS

Aerator, hand or powered

SELECTED AUDIOVISUAL MATERIALS

Slides: Lawn Renovation and Reestablishment, Ohio Agricultural Education Curriculum Materials Service.

SELECTED REFERENCES

Teaching Materials:
Turf Management, Ohio Agricultural Education Curriculum Materials Service.

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.3 Haul and spread topsoil

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.3

PERFORMANCE OBJECTIVE

P18.3 Given access to an area requiring topsoil and the required tools and equipment, haul and spread topsoil on the designated area to a depth that is judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.3.1 Determine area needing topsoil and depth to be filled.

E18.3.2 Place fill stakes at regular intervals to indicate proper depth.

E18.3.3 Choose route for hauling topsoil to fill site.

E18.3.4 Load wheelbarrow, transport, and dump topsoil.

E18.3.5 Spread topsoil to desired depth.

E18.3.6 Level the topsoil with a rake.

CRITERION-REFERENCED MEASURE

C18.3 Haul and spread topsoil on a designated area to a depth that is judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students examine site and calculate amount of topsoil required for filling (E18.3.1).

2. Demonstrate method of calculating volume of wheelbarrow and determine number of trips and length of time to complete the job (E18.3.1-E18.3.3).

3. Assign work crew roles to class members to simulate a landscaping crew (E18.3.1-E18.3.6).

SELECTED TOOLS AND MATERIALS

Fill stakes
Rake
Shovel
Wheelbarrow
Instructor-prepared checklist for spreading topsoil

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

18. GROUNDSKEEPING

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

18.4 Prepare and apply a compost

COURSE

Natural Resources Management III
(8040)

18.4

PERFORMANCE OBJECTIVE

P18.4 Given access to a compost bin, tools, and organic materials, prepare and apply a compost. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.4.1 Prepare compost using the following procedure:
  a. Add 12" layer of organic material to bin.
  b. Wet thoroughly and pack materials.
  c. Add second layer of different material, if available.
  d. Uniformly spread decomposition chemical.
  e. Repeat steps a-d until desired depth is reached.
  f. Surface should be flat or slightly concave.

E18.4.2 Apply compost using the following procedure:
  a. Determine compost supply available or amount needed to improve the soil.
  b. Spread half of compost supply uniformly over soil area.
  c. Till into soil.
  d. Spread remaining compost over soil area.
  e. Till soil and compost thoroughly.
  f. Surface should be level and compost throughly incorporated when task is completed.

E18.4.3 Define terminology associated with preparing and applying a compost.

CRITERION-REFERENCED MEASURE

C18.4 Prepare and apply a compost. Successful performance will be an acceptable rating on instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare a compost at school or at the work site and use the compost in improving soil (E18.4.1-E18.4.3).

2. Have each student with suitable facilities at home prepare a compost pile and use the compost on the home grounds (E18.4.1-E18.4.3).

3. Encourage students to develop a small-scale business providing compost and application service (E18.4.1-E18.4.3).

SELECTED TOOLS AND MATERIALS

Compost bin
Decomposition chemical
Organic materials
Rotary tiller
Shovels
Wheelbarrow
Instructor-prepared checklist on
compost preparation

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.5 Sterilize soil

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.5

PERFORMANCE OBJECTIVE

P18.5 Given access to a soil area and the necessary tools and equipment, sterilize the soil with fumigants or chemicals in either granular or powered formulations, according to manufacturer's specifications.

SELECTED ENABLING OBJECTIVES

E18.5.1 Prepare soil area for sterilization as recommended by manufacturer of product to be used.

E18.5.2 Identify recommended amount of fumigant or chemical.

E18.5.3 Place warning signs in noticeable locations.

E18.5.4 Identify safety procedures given by manufacturer.

E18.5.5 Demonstrate ability to use coverings needed by soil fumigants.

E18.5.6 Explain time restrictions specified by manufacturer before using soil.

E18.5.7 Define terminology associated with sterilizing soil.

CRITERION-REFERENCED MEASURE

C18.5 Sterilize soil using fumigants or other chemical formulations, according to manufacturer's specifications.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students determine the need for soil sterilization by an experimental method. Use untreated samples of soil containing either fungi, nematodes or weed, seed, etc., and sterilized soil. Have students observe and describe the results and discuss terminology (E18.5.1-E18.5.7).

2. Demonstrate use of coverings needed by soil fumigants and discuss recommended use of chemicals or fumigants (E18.5.2-E18.5.6).

3. Explain use and importance of following safety procedures and correctly marking the area with warning signs (E18.5.3, E18.5.4).

4. Discuss necessity of observing time restrictions as specified by the manufacturer (E18.5.6).

SELECTED TOOLS AND MATERIALS

Untreated samples of soil
Plastic
Soil sterilizers (fumigant or chemical)
Manufacturer's specifications

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

——Application——

CONTENT/CONCEPT

18. GROUNDSKEEPING

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

18.6 Add mulch to new seedlings

COURSE

Natural Resources Management III
(8040)

18.6

PERFORMANCE OBJECTIVE

P18.6 Given access to a bed of seedlings, bark mulching materials, and necessary tools, add mulch to new seedlings. Acceptable performance will be when mulch is added around plants to a depth of 2 to 3 inches and the entire boundaries of the bed are covered, or a distance equal to the diameter of plant top growth.

SELECTED ENABLING OBJECTIVES

E18.6.1 Prepare soil for mulch, if necessary.

E18.6.2 Spread mulch evenly over bed.

E18.6.3 Add enough mulch to allow for settling.

E18.6.4 Smooth top of mulch, if necessary.

E18.6.5 Define terminology associated with mulching.

CRITERION-REFERENCED MEASURE

C18.6 Add mulch to new seedlings. Acceptable performance will be when mulch is added around plants to a depth of 2 to 3 inches and the entire boundaries of the bed are covered, or a distance equal to the diameter of plant top growth.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Demonstrate adding mulch to new seedlings to students (E18.6.1-E18.6.5).
2. List terminology associated with mulching on the chalkboard and discuss (E18.6.5).

SELECTED TOOLS AND MATERIALS

Rake
Shovel
Wheelbarrow
Seedlings
Bark mulching materials

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
<ins>The Nursery Worker</ins>, Ohio Agricultural Education Curriculum Materials Service.

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.7 Check plants for insects

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.7

PERFORMANCE OBJECTIVE

P18.7 Given access to plant material in indoor and outdoor settings, check the plants for insects. Successful performance will be when observations are consistent with those made by the instructor and they are acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.7.1 Determine overall appearance of plant; look for wilting, discoloring, defoliation, webbing, or other symptom of insect presence.

E18.7.2 Describe surfaces of the plant and the soil surrounding the plant.

E18.7.3 Identify the insect damage as caused by a chewing or sucking insect.

E18.7.4 Identify the particular insect causing damage to the plant.

E18.7.5 Describe beneficial insects as well as harmful insects.

CRITERION-REFERENCED MEASURE

C18.7 Check plants for insects. Successful performance will be when observations are consistent with those made by the instructor and they are acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students bring samples of insect-infested plants and insect-free plants to class for observation (E18.7.1).
2. Demonstrate to students how to perform the task of checking plants for insects by using the naked eye and a hand lens (E18.7.1-E18.7.5).
3. Have students determine severity of insect infestation and the particular insect causing the damage (E18.7.1-E18.7.5).

SELECTED TOOLS AND MATERIALS

Hand lens
Instructor-prepared checklist on checking plants for insects

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Controlling Tree and Shrub Insects, Vocational Agriculture Service.
Identifying Tree and Shrub Insects, Vocational Agriculture Service.
The Insect Identification Manual, Vocational Education Productions.

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.8 Remove weeds and grasses from flower bed

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.8

PERFORMANCE OBJECTIVE

P18.8 Given a hoe or hand weeder, remove weeds and grasses from flower beds without damaging existing flowers. The instructor will examine the flower beds upon completion of the task, and acceptable performance will be when all weeds and grasses have been removed without damage to the flowers, according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.8.1 Determine if weeds and grasses can be removed easily. If not, soak the flower beds until weeds remove easily.

E18.8.2 Demonstrate ability to use hoe or hand weeder to uproot weeds and grasses.

E18.8.3 Rake weeds and grasses to edge of bed.

E18.8.4 Dispose of weeds and grasses.

E18.8.5 Add new soil or mulch and rake surface of flower beds until smooth.

CRITERION-REFERENCED MEASURE

C18.8 Remove weeds and grasses from flower beds. The instructor will examine the flower beds upon completion of the task, and acceptable performance will be when all weeds and grasses have been removed without damage to the flowers, according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Examine sites in the local community where weeds and grasses have not been controlled, especially in flower beds (E18.8.1-E18.8.5).
2. Demonstrate removal of weeds and grasses from flower beds (E18.8.1-E18.8.5).
3. Discuss with students the advantages of beginning a weed removal business because of the limited capital investment required (E18.8.1-E18.8.5).

SELECTED TOOLS AND MATERIALS

Hand weeder
Hoe
Instructor-prepared checklist
  on weeding

SELECTED AUDIOVISUAL MATERIALS

Slidefilm: Weed Identification, Vocational Agriculture Service.

SELECTED REFERENCES

Teaching Materials:
Controlling Weeds, Vocational Agriculture Service.
Selected Weeds of the United States, USDA, Agricultural Research Service.

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.9 Plant annual flowers

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.9

PERFORMANCE OBJECTIVE

P18.9 Given containers of annual plants, access to a seedbed, water, and planting tools, plant annual flowers. The instructor will examine the flower bed, and acceptable performance will be when 100 percent of criteria on instructor-prepared checklist have been achieved and approved.

SELECTED ENABLING OBJECTIVES

E18.9.1 Check soil for proper moisture and composition.

E18.9.2 Dig hole to following rule of thumb: twice width of root ball and slightly deeper than root ball.

E18.9.3 Remove plant from container just prior to planting by cutting two sides of the container.

E18.9.4 Pull root ends loose from ball on compacted plants.

E18.9.5 Set plant into hole and fill in with soil under and around root ball. Top of root ball should be flush with top of existing seedbed.

E18.9.6 Water-in plants.

E18.9.7 Provide shade from sun, if needed.

E18.9.8 Define terminology associated with planting flowers.

CRITERION-REFERENCED MEASURE

C18.9 Plant annual flowers. The instructor will examine the flower bed, and acceptable performance will be when 100 percent of criteria on instructor-prepared checklist have been achieved and approved.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Demonstrate planting annual flowers to students (E18.9.1-E18.9.8).

2. Have students perform the task of planting annual flowers (E18.9.1-E18.9.8).

3. Select a suitable site, and for a class or FFA project, plant annual flowers in order to beautify the school or community (E18.9.1-E18.9.8).

SELECTED TOOLS AND MATERIALS

Annual plants
Scissors
Shade cloth
Shovel or hand trowel
Watering can
Instructor-prepared checklist
  for planting annual flowers

SELECTED AUDIOVISUAL MATERIALS

Slides with script: Annuals, Ohio Agricultural Education Curriculum Materials Service.

SELECTED REFERENCES

Teaching Materials:
Growing Flowering Annuals, Vocational Agriculture Service.

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

18.10 Plant flower bulbs

COURSE

Natural Resources Management III
(8040)

18.10

PERFORMANCE OBJECTIVE

P18.10 Given flower bulbs, access to a seedbed, water, and planting tools, plant bulbs. The instructor will examine the flower bed upon completion of the task, and acceptable performance will be when 100 percent of criteria on instructor-prepared checklist have been achieved and approved.

SELECTED ENABLING OBJECTIVES

E18.10.1 Remove bulb from package or storage bed. If from bed, take a generous amount of soil with each bulb.

E18.10.2 Dig hole to following rule of thumb: 2½ to 3 times diameter of bulb for depth and twice the diameter for width.

E18.10.3 Place bulb in hole with pointed end in upward position.

E18.10.4 Fill in hole with soil.

E18.10.5 Provide adequate moisture for growth.

CRITERION-REFERENCED MEASURE

C18.10 Plant flower bulbs. The instructor will examine the flower bed upon completion of the task, and acceptable performance will be when 100 percent of criteria on instructor-prepared checklist have been achieved and approved.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Demonstrate planting bulbs to students (E18.10.1-E18.10.5).
2. Discuss with students the importance of providing the bulbs with adequate moisture (E18.10.5).
3. Observe students planting bulbs and evaluate performance, using a checklist (E18.10.1-E18.10.5).

SELECTED TOOLS AND MATERIALS

Bone meal
Bulb planter
Bulbs
Shovel or hand trowel
Instructor-prepared checklist
  for planting bulbs

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Time-Life Books

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.11 Wrap trees or shrubs to protect from weather

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

18.11

PERFORMANCE OBJECTIVE

P18.11 Given access to trees and shrubs requiring wrapping and the necessary wrapping materials, wrap the trees or shrubs to protect from the weather. Acceptable performance will be when vulnerable areas are completely covered and the covering has been applied so that it will withstand winter weather.

SELECTED ENABLING OBJECTIVES

E18.11.1 Determine areas of trees and shrubs vulnerable to winter weather.

E18.11.2 Select a suitable wrapping material for the tree or shrub.

E18.11.3 Demonstrate knowledge of manufacturer's recommendations in applying the wrapping materials.

E18.11.4 Determine if wrappings are secure through periodic observations.

CRITERION-REFERENCED MEASURE

C18.11 Wrap trees or shrubs to protect from the weather. Acceptable performance will be when vulnerable areas are completely covered and the covering has been applied so that it will withstand winter weather.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide examples of wrappings used in the local community to protect trees or shrubs from the weather (E18.11.1, E18.11.2).
2. Demonstrate wrapping trees or shrubs to students (E18.11.1-E18.11.4).
3. Discuss with students the possibility of providing this service to local homeowners as a business venture (E18.11.1-E18.11.4).

SELECTED TOOLS AND MATERIALS

Burlap
String

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Time-Life Books

CONTENT/CONCEPT

18. GROUNDSKEEPING

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

18.12 Compile information necessary for purchasing chemicals for a specific use

COURSE

Natural Resources Management IV
(8042)

18.12

PERFORMANCE OBJECTIVE

P18.12 Given a description of a landscaped area, compile information necessary for purchasing chemicals for a specific use. Information must include brand names, item quantities, cost, and supplier names and addresses.

SELECTED ENABLING OBJECTIVES

E18.12.1 Describe lanscaped area.

E18.12.2 Locate appropriate reference literature.

E18.12.3 Determine specific need for chemicals.

E18.12.4 Identify Cooperative Extension Service literature regarding common insects and diseases, recommended chemicals for control, and chemical application rates.

E18.12.5 List chemical type and application rate for the specific usage under consideration.

E18.12.6 List chemicals to be purchased, including the brand name, item quantities, and supplier.

E18.12.7 Compute costs of chemicals to be purchased.

E18.12.8 Define terminology associated with purchasing chemicals.

CRITERION-REFERENCED MEASURE

C18.12 Compile information necessary for purchasing chemicals for a specific use. Information must include names, item quantities, cost, and supplier names and addresses.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare several case studies for students involving the need to purchase chemicals. Have students gather the information listed in C18.12 for each case study (E18.12.1-E18.12.8).

2. Have students prepare a bulletin board display of chemical manufacturer's promotional literature (E18.12.6).

3. Invite a chemical company representative to speak to the class about the necessity of chemical usage (E18.12.3).

SELECTED TOOLS AND MATERIALS

Bulletin board
Case studies situations

SELECTED AUDIOVISUAL MATERIALS

Slidefilms: Selecting and Handling Pesticides, Vocational Agriculture Service.

SELECTED REFERENCES

Teaching Materials:
Guidelines for the Control of Insect and Mite Pests of Foods, Fibers, Feeds, Ornamentals, Livestock, Households, Forests, and Forest Products, USDA, Science and Education Administration and Forest Service.

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.13 Apply chemical treatment to diseased plants

PROGRAM

AGRICULTURAL RESOURCES

COURSE

Natural Resources Management IV (8042)

18.13

PERFORMANCE OBJECTIVE

P18.13 Given access to diseased plants, chemical treatment charts, and the required equipment, apply a chemical treatment to diseased plants to correct or arrest the disease. All precautions listed on the chemical container should be observed, as well as general safety rules of application, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.13.1 Determine proper chemical for usage.

E18.13.2 Explain container label with regard to application directions and precautions.

E18.13.3 Identify existing weather conditions and determine if spray can be applied.

E18.13.4 Prepare equipment and chemical mixture.

E18.13.5 Demonstrate application procedures for spraying affected area of plants.

E18.13.6 Dispose of chemical container and excess chemical.

E18.13.7 Store chemical in safe location.

E18.13.8 Clean spray equipment and store.

E18.13.9 Wash exposed skin areas with soap and water.

CRITERION-REFERENCED MEASURE

C18.13 Apply a chemical treatment to diseased plants to correct or arrest the disease. All precautions listed on the chemical container should be observed as well as general safety rules of application, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students read chemical container labels and explain aloud the application directions and safety precautions (E18.13.2).

2. Have students prepare and apply sprays to diseased plants in dry-run fashion by using water as the chemical to be mixed. This will allow students to perform the task without danger to plants, themselves, or others (E18.13.1-E18.13.9).

SELECTED TOOLS AND MATERIALS

Chemical application equipment
Personal protective devices (respirator, rubber gloves)
Instructor-prepared checklist on applying chemical treatments for diseased plants

SELECTED AUDIOVISUAL MATERIALS

Slides: Applying Pesticides, American Association for Vocational Instructional Materials.
Slidefilm: Calibrating and Applying Pesticides Safely, Vocational Agriculture Service.

SELECTED REFERENCES

Teaching Materials:
Applying Pesticides, (manual) American Association for Vocational Instructional Materials.

Application

CONTENT/CONCEPT

18. GROUNDSKEEPING

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

18.14 Apply chemical treatment to insect-infested plants

COURSE

Natural Resources Management IV
(8042)

18.14

PERFORMANCE OBJECTIVE

P18.14 Given access to insect-infested plants and chemical treatment charts, apply a chemical treatment which will kill the identified insects. All precautions listed on the chemical container should be observed, as well as general safety rules of application, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.14.1 Determine proper chemical for usage.

E18.14.2 Explain container label with regard to application directions and precautions.

E18.14.3 Identify existing weather conditions and determine if spray can be applied.

E18.14.4 Prepare equipment and chemical mixture.

E18.14.5 Demonstrate application procedures for spraying affected area of plants.

E18.14.6 Dispose of chemical container and excess chemical.

E18.14.7 Store chemical in safe location.

E18.14.8 Clean spray equipment and store.

E18.14.9 Wash exposed skin areas with soap and water.

CRITERION-REFERENCED MEASURE

C18.14 Apply chemical treatments to plants infested with insects. All precautions listed on the chemical container should be observed, as well as general safety rules of application, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students read chemical container labels and explain aloud the application directions and safety precautions (E18.14.2).

2. Have students prepare and apply sprays to insect-infested plants in dry-run fashion by using water as the chemical to be mixed. This will allow students to perform the task without danger to plants, themselves, or others (E18.14.1-E18.14.9).

SELECTED TOOLS AND MATERIALS

Chemical application equipment
Personal protective devices (respirator, rubber gloves)
Instructor-prepared checklist on applying chemical treatments for insect-infested plants

SELECTED AUDIOVISUAL MATERIALS

Slides: Applying Pesticides, American Association for Vocational Instructional Materials.
Slidefilm: Calibrating and Applying Pesticides Safely, Vocational Agriculture Service.

SELECTED REFERENCES

Teaching Materials:
Applying Pesticides, American Association for Vocational Instructional Materials.

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.15 Apply weed-killing compounds to lawns

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

18.15

PERFORMANCE OBJECTIVE

P18.15 Given access to a lawn with weeds and weed-killing compounds, apply a weed-killing compound over all areas of the lawn. All precautions listed on the chemical container should be observed, as well as general safety rules of application, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.15.1 Demonstrate knowledge of safety practices when handling, applying, and storing weed killing compounds.

E18.15.2 Identify the weed(s) present in the lawn.

E18.15.3 Determine the correct herbicide to purchase for application.

E18.15.4 Describe the proper method(s) of chemical application.

E18.15.5 Determine the proper time to apply chemicals (time of year and time of day).

E18.15.6 Explain the effects of chemical application upon weeds and desirable lawn grasses.

E18.15.7 Store excess chemical properly.

E18.15.8 Clean and store spray equipment

E18.15.9 Define terminology associated with applying weed-killing compounds.

CRITERION-REFERENCED MEASURE

C18.15 Apply weed-killing compound all over areas of lawn. All precautions listed on the chemical container should be observed, as well as general safety rules of application, and performance must be judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students read chemical container labels and explain aloud the application directions and safety precautions (E18.15.4).

2. Have students prepare and apply sprays to lawns in dry-run fashion by using water as the chemical to be mixed. This will allow students to perform the task without danger to plants, themselves, or others (E18.15.1-E18.15.9).

SELECTED TOOLS AND MATERIALS

Herbicide application equipment
Personal protective devices (respirator, rubber gloves)
Instructor-prepared checklist on weed killing with lawns

SELECTED AUDIOVISUAL MATERIALS

Slidefilms: (1) Lawn Weeds - Identification and Control, and
(2) Weed Identification, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Time-Life Books

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.16 Prune and trim trees

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

18.16

PERFORMANCE OBJECTIVE

P18.16 Given access to several sizes of trees requiring pruning, pruning equipment, and a handout describing procedures to be followed, prune and trim trees. Acceptable performance will be when all proposed pruning cuts have been approved by the instructor according to prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.16.1 Describe natural shape of mature tree of a particular species.

E18.16.2 Remove suckers and low branches that are in the way.

E18.16.3 Eliminate competing trunks early in growth cycle of tree, except for certain varieties.

E18.16.4 Determine best branches for limbs by examining symmetry and angle with main trunk.

E18.16.5 Eliminate rubbing and inward-growing branches.

E18.16.6 Remove branch by cutting close to trunk or main branch and leave no stem.

E18.16.7 Remove large, heavy branches by making a safety cut out from the trunk on the underside of the branch.

E18.16.8 Demonstrate ability to use tree wound paint on exposed surfaces of substantial size.

CRITERION-REFERENCED MEASURE

C18.16 Prune and trim trees. Acceptable performance will be when all proposed pruning cuts have been approved by the instructor according to prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students sketch the natural shapes of several different tree species (E18.16.1).
2. Have students examine tools to be used and describe the proper usage of each one (P18.16).
3. Have students use flagging or tape to indicate where they would make pruning cuts on individual trees (E18.16.1-E18.16.7).
4. Invite a tree surgeon to speak to the class about this specialized occupation (P18.16).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on pruning procedures
Pruning equipment
Tree wound paint
Instructor-prepared checklist on pruning and trimming trees

SELECTED AUDIOVISUAL MATERIALS

Slidefilms: (1) Pruning Deciduous Shrubs,
(2) Pruning Evergreens,
(3) Pruning Flowering Trees, Vocational Agriculture Service.

SELECTED REFERENCES

Books:
Time-Life Books

Teaching Materials:
Pruning Shade Trees, Vocational Agriculture Service.

CONTENT/CONCEPT

18. GROUNDSKEEPING

TASK/COMPETENCY

18.17 Develop fertilization schedules

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

18.17

PERFORMANCE OBJECTIVE

P18.17 Given a description of a landscaped area, results of a soil test, and an instructor-prepared schedule form, develop a fertilization schedule covering a one-year calendar period for applying fertilizer to shrubs, flowers, trees, and lawns. The schedule must be approved according to an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E18.17.1 Examine description of landscaped area.

E18.17.2 Examine results of soil testing.

E18.17.3 List each type shrub, flower, tree, and lawn area on prepared schedule form.

E18.17.4 Identify Cooperative Extension Service publications to determine analysis of various fertilizers and recommended rates of application.

E18.17.5 List type of fertilizer, rate of application, method of application for applying fertilizer to shrubs, flowers, trees, and lawn areas.

E18.17.6 Determine approximate dates for application.

E18.17.7 Keep records of fertilizer appications.

E18.17.8 Apply mathematical skills associated with developing fertilization schedules.

CRITERION-REFERENCED MEASURE

C18.17 Develop fertilization schedules covering a one-year calendar period for applying fertilizer to flowers, trees, and lawns of an area designated by the instructor. The schedule must be approved according to an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Provide or have students prepare a description of a landscaped area (E18.17.1).

2. Have students complete fertilization schedules and compare their answers with those of the instructor or a local nurseryworker (E18.17.1-E18.17.8).

3. Examine fertilization schedules and practices of local grounds-keeping services (E18.17.1-E18.17.8).

4. Have students contract with individuals or businesses to provide a custom applicator service for fertilizer (E18.17.1-E18.17.7).

5. Select an area of the school grounds for which students are to develop a fertilization schedule. Share this information with the appropriate school employee (E18.17.1-E18.17.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared schedule form
Instructor-prepared checklist on fertilization

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Fertilizing and Watering Shade and Ornamental Trees, Vocational Agriculture Service.

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

TASKS/COMPETENCIES

19.1 Demonstrate safety practices while boating

19.2 Demonstrate safety practices while hunting

19.3 Demonstrate safety practices while using tools and equipment

19.4 Identify safe storage methods for chemicals

19.5 Develop a list of safety regulations for workers

19.6 Demonstrate knowledge of administering first aid to the ill or injured sportsperson

19.7 Explain method of investigating accidents or incidents

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

TASK/COMPETENCY

19.1 Demonstrate safety practices while boating

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resoruces Management III
(8040)

19.1

PERFORMANCE OBJECTIVE

P19.1 Given instruction on the safe operation of boats and access to a boat, demonstrate safety practices while boating. Acceptable performance will be an acceptable rating by the instructor on 100 percent of the items on the Safe Boating Checklist.

SELECTED ENABLING OBJECTIVES

E19.1.1 Identify human factors affecting boating safety.

E19.1.2 Identify general safety rules while boating.

E19.1.3 Identify specific safety rules for the type of boat used.

E19.1.4 Define terminology associated with safety and boating.

E19.1.5 Determine those adverse weather conditions that require action.

E19.1.6 Describe rescue procedures for boating accident victims.

E19.1.7 Demonstrate ability to administer first-aid treatment to boating accident victims.

E19.1.8 Explain the importance of swimming ability with regard to boating safety.

CRITERION-REFERENCED MEASURE

C19.1 Demonstrate safety practices while boating. Acceptable performance will be an acceptable rating by the instructor on 100 percent of the items on the Safe Boating Checklist (see Test #19).

STUDENT'S NAME: ____________________ TEST # 19

COURSE # ____________________ P. O. # 19.1

DATE: ____________________ STANDARD: 100%

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: ___

SAFE BOATING CHECKLIST

ITEM	INSTRUCTOR'S CHECKLIST Acceptable	 Unacceptable
While operating a boat, the student:		
1. Wore a lifejacket and required other passengers to do likewise.	___	___
2. Balanced and secured cargo evenly between port and starboard, and foreand aft.	___	___
3. Examined craft and safety equipment before leaving shore.	___	___
4. Remained seated and did not make sudden moves in boat.	___	___
5. Used an anchor properly.	___	___
6. Used oars, paddles, or motor in an appropriate manner.	___	___
7. Shut off the engine before refueling and avoided fuel spills during refueling.	___	___
8. Followed navigational markers or other instructions properly.	___	___

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare an oral or written report describing one aspect of practicing safety while boating (E189.1.1-E19.1.7).

2. Describe hypothetical situations and have students discuss safety aspects (E19.1.1-E10.1.7).

3. Conduct role plays with students concerning aspects of boating safety (E19.1.1-E19.1.7).

4. Have students practice safe boating on a nearby body of water (E19.1.1-E19.1.7).

5. Have class or local FFA chapter sponsor a camping trip involving boating (E19.1.1-E19.1.8).

6. Invite a local rescue squad or game warden to discuss or demonstrate the topic to the students (E19.1.1-E19.1.7).

SELECTED TOOLS AND MATERIALS

Boat, including appropriate safety equipment
Safe Boating Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Films: (1) Prescription for Boating Safety and Pleasure, and
(2) Whitewater Primer, Virginia Commission of Game and Inland Fisheries.

SELECTED REFERENCES

Books:
Basic Canoeing Techniques, Rulon D. Skinner.

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.
Motorboat Owner's Guide, Virginia Commission of Game and Inland Fisheries.

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

TASK/COMPETENCY

19.2 Demonstrate safety practices while hunting

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resurces Management III
(8040)

19.2

PERFORMANCE OBJECTIVE

P19.2 Given instruction on the safe use of firearms and access to area for hunting, demonstrate safety practices while hunting. Successful performance will be an acceptable rating by the instructor on 100 percent of the items on the Safe Hunting Checklist.

SELECTED ENABLING OBJECTIVES

E19.2.1 Identify human factors affecting hunting safety.

E19.2.2 Identify general safety rules while hunting.

E19.2.3 Identify specific safety rules for the type of weapon used.

E19.2.4 Define terminology associated with safety and hunting.

E19.2.5 Determine those adverse weather conditions that require action.

E19.2.6 Demonstrate ability to administer first-aid treatment to hunting accident victims.

CRITERION-REFERENCED MEASURE

C19.2 Demonstrate safety practices while hunting. Successful performance will be an acceptable rating by the instructor on 100 percent of the items on the Safe Hunting Checklist (see Test #20)

STUDENT'S NAME: ____________________ TEST # 20

COURSE: ____________________ P. O. # 19.2

DATE: ____________________ STANDARD: 100%

TEACHER'S NAME: ____________________ PERFORMANCE LEVEL: __________

SAFE HUNTING CHECKLIST

ITEM	INSTRUCTOR'S RATING	
While hunting, the student:	Satisfactory	Unsatisfactory
1. Wore appropriate safety clothing to alert others.	____	____
2. Treated weapon as if it were loaded at all times.	____	____
3. Inspected weapon and accessories before commencing to hunt.	____	____
4. Loaded and unloaded weapon in a safe manner.	____	____
5. Avoided horseplay or careless behavior.	____	____
6. Kept weapon pointed away from others.	____	____
7. Carried bow, crossbow, or firearm properly.	____	____
8. Crossed fences and streams properly.	____	____
9. Made sure of the target before firing.	____	____
10. Inspected target area after firing to determine results.	____	____

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students prepare an oral or written report describing one aspect of practicing safety while hunting (E19.2.1-E19.2.6).
2. Describe hypothetical situations and have students discuss safety aspects (E19.2.1-E19.2.6).
3. Conduct role play with students concerning aspects of hunting safety (E19.2.1-E19.2.6).
4. Have students practice hunting safety on a target range or hunting preserve (E19.2.1-E19.2.6).
5. Have class or local FFA chapter sponsor a hunting trip (E19.2.1-E19.2.6).
6. Sponsor a hunter safety class conducted by a qualified instructor for interested students (E19.2.1-E19.2.3).

SELECTED TOOLS AND MATERIALS

Firearms
Safety vest
Bow and arrows
Safe Hunting Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

None identified

Application

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

TASK/COMPETENCY

19.3 Demonstrate safety practices while using tools and equipment

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management III
(8040)

19.3

PERFORMANCE OBJECTIVE

P19.3 Given instruction on the safe operation of tools and equipment, demonstrate safety practices while using tools and equipment. Successful performance will be an acceptable rating by the instructor on 100 percent of the items on the Tool and Equipment Safety Checklist.

SELECTED ENABLING OBJECTIVES

E19.3.1 Identify human factors affecting tool and equipment safety.

E19.3.2 Identify general safety rules for using tools and equipment.

E19.3.3 Identify tools and equipment used in student's occupational placement.

E19.3.4 Demonstrate knowledge of information in operator's manual, especially noting safety precautions.

E19.3.5 Identify specific safety rules for tools and equipment to be operated.

E19.3.6 Explain procedures to follow to maintain tools and equipment in proper operating condition.

E19.3.7 Define terminology associated with safety in using tools and equipment.

CRITERION-REFERENCED MEASURE

C19.3 Demonstrate safety practices while using tools and equipment. Successful performance will be an acceptable rating by the instructor on 100 percent of the items on the Tool and Equipment Safety Checklist (see Test #21).

STUDENT'S NAME: ____________________ TEST # 21

COURSE # ____________________ P.O. # 19.3

DATE: ____________________ STANDARD: 100%

TEACHER"S NAME: ____________________ PERFORMANCE LEVEL: ____________

TOOL AND EQUIPMENT SAFETY CHECKLIST

ITEM	INSTRUCTOR'S RATING	
While using tools and equipment, the student:	Satisfactory	Unsatisfactory
1. Checked all handles for secure fit and inspected handle for soundness.	______	______
2. Used tool guard on cutting edge of tool.	______	______
3. Maintained sharpness of the tool by keeping it touched up.	______	______
4. Transported tool in a safe manner.	______	______
5. Used tool in a proper manner.	______	______
6. Checked all equipment for wear or damage before operating.	______	______
7. Checked all electrical cords for breaks and used grounding connections or double-insulated cases.	______	______
8. Wore gloves, safety shoes, safety glasses, or other safety clothing where needed.	______	______
9. Secured work material properly before using equipment.	______	______
10. Used equipment in a proper manner.	______	______

SELECTED INSTRUCTIONAL ACTIVITIES

1. Discuss proper and improper attitudes toward safety that either prevent or contribute to accidents (E19.3.1-E19.3.7).

2. Have students identify occupations which would require certain protective clothing or equipment (E19.3.3).

3. Demonstrate the proper usage of tools and equipment to students (E19.3.1-E19.3.6).

4. Have students read operator's manual and underline the safety precautions listed (E19.3.4).

5. Have students complete written and oral safety examinations for handtools and equipment used (E19.3.2-E19.3.7).

SELECTED TOOLS AND MATERIALS

Assorted tools and equipment for demonstration
Safety equipment and clothing
Tools and Equipment Safety Checklist (see attached)

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: School Shop Safety, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, pp. 239-248, USDA, Forest Service.
Health and Safety Code Handbook, USDA, Forest Service.
Safety in the Agricultural Mechanics Shop, Vocational Agriculture Service.

Application

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

19.4 Identify safe storage methods for chemicals

COURSE

Natural Resources Management III
(8040)

19.4

PERFORMANCE OBJECTIVE

P19.4 Given instruction on chemical storage, identify in a written report safe storage methods for chemicals used in natural resources management applications. Acceptable performance will include describing the items in C19.4 and achieving an acceptable rating on instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E19.4.1 Identify properties of the particular chemical to be sorted.

E19.4.2 Describe a properly located storage facility in inside and outside locations.

E19.4.3 Describe the temperature, moisture conditions, and fire standards of a storage facility.

E19.4.4 Identify the warning signs to be posted in a storage area.

E19.4.5 Describe the proper arrangement of chemicals in a storage area.

E19.4.6 Identify damaged and improper containers for chemicals.

E19.4.7 List specific safety measures which should be used for a particular chemical.

CRITERION-REFERENCED MEASURE

C19.4 Identify in a written report safe storage methods for chemicals used in natural resources management applications. Acceptable performance will be a description that includes location, environment conditions, safety warnings, arrangement, containers, and safety measures to observe. An acceptable rating on instructor-prepared checklist must also be achieved.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare handouts describing hazardous materials and their handling, incompatible chemicals, and the marking and labeling system for hazardous materials (E19.4.1, E19.4.7).

2. Examine storage sites for chemicals at two natural resources management businesses or agencies (E19.4.2-E19.4.6).

3. Have students prepare oral reports regarding an aspect of chemical storage (E19.4.2-E19.4.6).

4. Have students construct model storage facilities for a given situation (E19.4.1-E19.4.7).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handouts on handling hazardous materials
Instructor-prepared checklist on chemical storage

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Service.

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

TASK/COMPETENCY

19.5 Develop a list of safety regulations for workers

Application

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

19.5

PERFORMANCE OBJECTIVE

P19.5 Given the operator's manual and a description of the task to be performed, develop a list of safety regulations for workers using the piece of equipment to complete the task. At least five safety regulations should be developed and approved by the instructor. Instructor's approval will be based the technical accuracy of the regulation and the importance it has in relation to completion of the task, as evaluated by prepared checklist.

SELECTED ENABLING OBJECTIVES

E19.5.1 Demonstrate knowledge of the operator's manual concerning manufacturer's specific precautions regarding use of the equipment.

E19.5.2 Determine workers familiarity with equipment operation.

E19.5.3 Write the safety regulation clearly.

CRITERION-REFERENCED MEASURE

C19.5 Develop a list of safety regulations for workers using a particular piece of equipment. At least five safety regulations should be developed and approved by the instructor. Instructor's approval will be based upon the technical accuracy of the regulation and the importance it has in relation to completion of the task, as evaluated by a prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students secure the operator's manual for a piece of equipment used in Natural Resouces Management and underline all the safety precautions listed in the manual (E19.5.1).
2. Discuss with students their familiarity with operating various pieces of equipment (E19.5.2).
3. Provide students several examples of written safety regulations and have students discover which one(s) contain ambiguous language (E19.5.3).
4. Have students write safety regulations for a particular piece of equipment (E19.5.1-E19.5.3).

SELECTED TOOLS AND MATERIALS

Operator's manual
Examples of written safety regulations
Instructor-prepared checklist on safety regulations

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Equipment for Reforestation and Timber Stand Improvement, pp. 239-248, USDA, Forest Service.

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

TASK/COMPETENCY

19.6 Demonstrate knowledge of administering first aid to an ill or injured sportsperson

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management IV
(8042)

19.6

PERFORMANCE OBJECTIVE

P19.6 Given a simulated situation requiring emergency first-aid treatment, demonstrate knowledge of administering first aid to an ill or injured sportsperson. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E19.6.1 Identify symptoms of illness exhibited by the sportsperson.

E19.6.2 Identify supplies in first-aid kit.

E19.6.3 Identify common wounds, fractures, and abrasions.

E19.6.4 Identify first, second, and third degree burns.

E19.6.5 List the appropriate procedures for wounds, fractures, abrasions, and burns.

E19.6.6 Determine the need for applying cardiopulmonary recusitation (CPR).

E19.6.7 List symptoms and appropriate treatment for exhaustion, shock, hypothermia, heat stroke, and drug overdosage.

E19.6.8 List symptoms and appropriate treatment for animal, snake, spider, and tick bites.

E19.6.9 Identify acceptable practices for transporting the ill or injured sportsperson.

E19.6.10 Define terminology associated with first-aid treatment.

CRITERION-REFERENCED MEASURE

C19.6 Administer first-aid to an ill or injured sportsperson in a simulated situation. Acceptable performance will be a score of 90 percent accuracy on instructor-prepared worksheet.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Arrange with local rescue squad or Red Cross office for students to receive emergency first-aid training and CPR traning (E19.6.1--E19.6.7).
2. Invite the appropriate resource person from a natural resources business or agency to speak to the class regarding this topic (E19.6.1-E19.6.10).
3. Develop several hypothetical situations, either written or through role playing, and have students list or role play the appropriate treatment actions (E19.6.1-E19.6.10).

SELECTED TOOLS AND MATERIALS

First-aid kit
Instructor-prepared worksheet on
first-aid treatment

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
The Outdoorsman's Medical Guide, Alan E. Nourse.

CONTENT/CONCEPT

19. IMPLEMENTING SAFETY PRACTICES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

19.7 Explain method of investigating accidents or incidents

COURSE

Postsecondary

19.7

PERFORMANCE OBJECTIVE

P19.7 Given information for a hypothetical situation, explain method of investigating the accident or incident. The investigation must be conducted by the rules and procedures of the appropriate agency or business and be compiled in a written report that is judged acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E19.7.1 Identify accident or incident occurences requiring further investigation.

E19.7.2 Describe the rules and procedures of a particular agency or business for investigating accidents or incidents.

E19.7.3 Explain the legal aspects of accident or incident investigation.

E19.7.4 Demonstrate ability to complete business or agency reporting forms.

E19.7.5 Maintain appropriate records of accident or incident.

CRITERION-REFERENCED MEASURE

C19.7 Explain method of investigating accidents or incidents in a hypothetical situation. The investigation must be conducted by the rules and procedures of the appropriate agency or business and be compiled in a written report that is judged acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Assign students the task of locating copies of the business or agency's rules and procedures for investigating accidents or incidents (E19.7.2).

2. Have students prepare a written or role-play hypothetical situation involving an accident or incident. Have each student conduct an investigation and complete necessary paperwork (E19.7.1-E19.7.5).

SELECTED TOOLS AND MATERIALS

Instructor-prepared case study
Instructor-prepared checklist
on accident investigation

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Health and Safety Code Handbook, USDA, Forest Services

CONTENT/ CONCEPT

20. SECURING NATURAL AREAS

TASKS/COMPETENCIES

20.1 Demonstrate ability to patrol assigned area

20.2 Demonstrate ability to apprehend violators and take appropriate action

20.3 Explain procedure for preparing cases for prosecution

20.4 Interpret fish and game laws, rules, and regulations

CONTENT/CONCEPT

20. SECURING NATURAL AREAS

TASK/COMPETENCY

20.1 Demonstrate ability to patrol assigned area

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

COURSE

Natural Resources Management V
(8044)

20.1

PERFORMANCE OBJECTIVE

P20.1 Given access to an appropriate area and resources on securing natural areas, demonstrate ability to patrol an assigned area. An acceptable rating must be achieved on all items on an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E20.1.1 Determine a schedule for patrolling a designated area.

E20.1.2 Explain to visitors the rules and regulations within the area, as needed.

E20.1.3 Identify ways to enforce rules and regulations impartially or inform the person responsible for enforcement.

E20.1.4 Outline the type of duties to be performed while on patrol.

E20.1.5 Identify situations requiring immediate action or those requiring additional assistance.

CRITERION-REFERENCED MEASURE

C20.1 Demonstrate ability to patrol an assigned area. An acceptable rating must be achieved on all items on an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students observe and/or interview security officers at a local natural resources business to determine types of duties performed (E20.1.4).
2. Determine appropriate actions for several case study situations and discuss with students (E20.1.2-E20.1.5).
3. Have students role-play typical and atypical situations that might be encountered while on patrol (E20.1.1-E20.1.5).
4. Invite a Forest Service representative to the class to discuss the topic (P20.1).

SELECTED TOOLS AND MATERIALS

Case study situations
Flashlight
Radio
Instructor-prepared checklist on patrolling

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Resource Law Enforcement, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Forest Service Law Enforcement, USDA, Forest Service.

CONTENT/CONCEPT

20. SECURING NATURAL AREAS

TASK/COMPETENCY

20.2 Demonstrate ability to apprehend violators and take appropriate action

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Postsecondary

20.2

PERFORMANCE OBJECTIVE

P20.2 Given a role-play situation on securing natural areas, demonstrate ability to apprehend violators and take appropriate action. Actions must be consistent with the guidelines of the business or agency of employment and must be acceptable according to instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E20.2.1 Determine which law or regulation was violated.

E20.2.2 Describe the prescribed procedure(s) of the natural resources business or agency that must be followed in violation cases.

E20.2.3 Identify situations that require additional assistance or technical expertise.

E20.2.4 Demonstrate ability to complete necessary paperwork required by the business or agency.

CRITERION-REFERENCED MEASURE

C20.2 Demonstrate ability to apprehend violators and take appropriate action in a role-play situation. Actions must be consistent with the guidelines of the business or agency of employment and must be acceptable according to instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students secure materials outlining the actions to be taken when violations of rules or laws have occurred (E20.2.1, E20.2.2).

2. Interview a local security officer at a natural resources business or agency to determine most frequent violations (E20.2.1).

3. Have students role play actions to be taken when observing violations of rules or laws (E20.2.1-E20.2.4).

SELECTED TOOLS AND MATERIALS

Case study situations
Instructor-prepared checklist on apprehending violators

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Forest Service Law Enforcement, USDA, Forest Service.

Application

CONTENT/CONCEPT

20. SECURING NATURAL AREAS

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

20.3 Explain procedure for preparing cases for prosecution

COURSE

Postsecondary

20.3

PERFORMANCE OBJECTIVE

P20.3 Given a case study situation involving a natural resources agency, explain procedure for preparing cases for prosecution by completing all required paperwork of the agency with 100 percent accuracy.

SELECTED ENABLING OBJECTIVES

E20.3.1 Identify evidence to obtain for legal action.

E20.3.2 Explain process of testifying in legal action.

E20.3.3 Describe the process of obtaining and serving warrants.

E20.3.4 Explain importance of consulting a legal opinion after completing all required reports and forms.

CRITERION-REFERENCED MEASURE

C20.3 Explain procedure for preparing cases for prosecution by completing all required paperwork of the agency with 100 percent accuracy.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Review all the details supplied in the case study (P20.3).
2. Prepare written reports and forms required by the agency or consult with the person responsible for prosecution (E20.3.1, E20.3.2).
3. Invite an individual (law enforcement officer, attorney, judge) knowledgeable in this area to review the case study and discuss with students (E20.3.1-E20.3.4).

SELECTED TOOLS AND MATERIALS

Case study situation
Agency forms

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Cultural Resources Law Enforcement: An Emerging Science, USDA, Forest Service.
Forest Service Law Enforcement, USDA, Forest Service.

CONTENT/CONCEPT

20. SECURING NATURAL AREAS

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

20.4 Interpret fish and game laws, rules, and regulations

COURSE

Postsecondary

20.4

PERFORMANCE OBJECTIVE

P20.4 Given examples of case study situations involving natural areas, interpret fish and game laws, rules, and regulations with 90 percent accuracy on instructor-prepared worksheet. The applicable law, rule, or regulation must be named for each situation given, along with an appropriate course of action to follow in enforcing the law, rule, or regulation.

SELECTED ENABLING OBJECTIVES

E20.4.1 Explain fish and game laws, rules, and regulations to individuals and groups.

E20.4.2 Identify the applicable law, rule, or regulation in a case study or role play situation.

E20.4.3 Paraphrase an appropriate course of action for enforcement.

E20.4.4 Define terminology associated with fish and game laws, rules, and regulations.

CRITERION-REFERENCED MEASURE

C20.4 Interpret fish and game laws, rules, and regulations with 90 percent accuracy on instructor-prepared worksheet. The applicable law, rule, or regulation must be named for each situation given, along with an appropriate course of action to follow in enforcing the law, rule, or regulation.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare case study situations involving a need for interpretation of a fish and game law, rule, or regulation (P20.4).
2. Have students match the case study information with the applicable law, rule, or regulation (E20.4.2).
3. Inform another person orally of the infraction and the subsequent enforcement penalties (E20.4.3).
4. Poll local conservation officers to determine most frequent laws requiring interpretation to the public (E20.4.1).

SELECTED TOOLS AND MATERIALS

Case study situations
Instructor-prepared worksheet on fish/game rules

SELECTED AUDIOVISUAL MATERIALS

Filmstrip: Resource Law Enforcement, Vocational Education Productions.

SELECTED REFERENCES

Teaching Materials:
Virginia Game Law Summary, (current year), Virginia Commission of Game and Inland Fisheries
Virginia's Fishing Regulations, (current year), Virginia Commission of Game and Inland Fisheries.

CONTENT/CONCEPT

21. APPLYING GENERAL KNOWLEDGE OF NATURAL RESOURCES

TASKS/COMPETENCIES

21.1 Define terms commonly used in natural resources management

21.2 Locate and interpret sources of weather information

21.3 Identify and list the natural resources of a given site

21.4 Identify, by common and scientific name, the common grasses and plants found in Virginia

CONTENT/CONCEPT

21. APPLYING GENERAL KNOWLEDGE OF NATURAL RESOURCES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

21.1 Define terms commonly used in natural resources management

COURSE

Natural Resources Management IV
(8042)

21.1

PERFORMANCE OBJECTIVE

P21.1 Given resources on natural resources management terminology, define terms commonly used in natural resources management. Acceptable performance will be a score of 80 percent correct answers on an instructor-prepared terminology test.

SELECTED ENABLING OBJECTIVES

E21.1.1 List terms commonly used in natural resources management.

E21.1.2 Locate a dictionary or other authoritative source for definitions.

E21.1.3 Formulate a personal definition that accurately presents the word's meaning.

E21.1.4 Demonstrate ability to use natural resources management terms in daily vocabulary.

CRITERION-REFERENCED MEASURE

C21.1 Define terms commonly used in natural resources management. Acceptable performance will be a score of 80 percent correct answers achieved on an instructor-prepared teminology test.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Prepare an extensive handout containing many of the terms that the student will encounter during the school year, semester, or other grading period. Have students locate or formulate definitions as the words are encountered during class lessons. Students may wish to add to the list as the class progresses. Include some of these words on each quiz or test (E21.1.1-E21.1.4).
2. Regularly conduct spelling-bee type contests where students must give either the correct word or its definition in order to continue playing (E21.1.1-E21.1.4).
3. Prepare bulletin boards, posters, or pictures illustrating terms used in natural resources management (E21.1.1-E21.1.2).

SELECTED TOOLS AND MATERIALS

Instructor-prepared handout on natural resources terms
Instructor-prepared terminology test
Bulletin board

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Forest Service Law Enforcement, pp. VII-1-VII-8, USDA, Forest Service.
Handbook for Eastern Timber Harvesting, pp. 129-134, USDA, Forest Service.
National Forest Landscape Management: Timber, pp. 5-18, USDA, Forest Service.
Resource Conservation Glossary, 3rd ed., Soil Conservation Society of America.
Understanding the Game of the Environment, pp. 157-174, USDA, Forest Service.
Wildland Planning Glossary, USDA, Forest Service.

CONTENT/CONCEPT

21. APPLYING GENERAL KNOWLEDGE OF NATURAL RESOURCES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

21.2 Locate and interpret sources of weather information

COURSE

Natural Resources Management IV
(8042)

21.2

PERFORMANCE OBJECTIVE

P21.2 Given case study information concerning an outdoor trip of several days' duration, locate and interpret sources of weather information that would be used during the trip. A list of sources, including advantages and disadvantages of each, should be compiled and listed, and all information must be judged acceptable according to an instructor-prepared checklist.

SELECTED ENABLING OBJECTIVES

E21.2.1 Compile a listing of sources of weather information.

E21.2.2 List the advantages and disadvantages of each source.

E21.2.3 Explain the functions of weather instruments such as a thermometer, barometer, etc.

E21.2.4 Identify good and adverse weather conditions by visual observation.

E21.2.5 Explain the symbols used in weather forecasting and maps.

E21.2.6 Describe various cloud formations and frontal systems and relate their significance to weather changes.

E21.2.7 Define terminology associated with weather information.

CRITERION-REFERENCED MEASURE

C21.2 Locate and interpret sources of weather information that would be used during an outdoor trip of several days' duration by compiling a list of sources along with the advantages and disadvantages of each source. All information must be judged acceptable according to an instructor-prepared checklist.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students compile a listing of sources of weather information (E21.2.1).

2. Have students survey individuals and businesses within the local community to determine the sources of weather information used (E21.2.1).

3. Arrange a field trip for students to visit a weather station to observe operating procedures (E21.2.1-E21.2.7).

4. Have students construct and operate a local weather station to collect data such as wind direction and velocity, temperature, rainfall, barometric pressure, etc. (E21.2.3).

SELECTED TOOLS AND MATERIALS

Weather station equipment
Barometer
Thermometer
Case study situations
Instructor-prepared checklist on locating/interpreting sources of weather information

SELECTED AUDIOVISUAL MATERIALS

Cloud charts

SELECTED REFERENCES

Books:
Secondary earth science textbook

CONTENT/CONCEPT

21. APPLYING GENERAL KNOWLEDGE OF NATURAL RESOURCES

PROGRAM

AGRICULTURAL RESOURCES
(03.0101)

TASK/COMPETENCY

21.3 Identify and list the natural resources of a given site

COURSE

Natural Resources Management V
(8044)

21.3

PERFORMANCE OBJECTIVE

P21.3 Given information regarding a specific natural resources site, identify and list the natural resources of the given site. The list should contain at least 90 percent of the items included on the instructor-prepared list of resources for that site.

SELECTED ENABLING OBJECTIVES

E21.3.1 Compile a complete checklist of natural resources.

E21.3.2 Identify each of the natural resources on the checklist in a natural state.

E21.3.3 Identify each natural resource found on the site and mark on the checklist.

E21.3.4 Demonstrate ability to classify resources on the site examined as either renewable or nonrenewable.

CRITERION-REFERENCED MEASURE

C21.3 Identify and list the natural resources of a given site. The list should contain at least 90 percent of the items included on the instructor-prepared list of resources for that site.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students develop a list of natural resources, including renewable and nonrenewable resources (E21.3.1).
2. Prepare pictures, sketches, or descriptions of each natural resource (E21.3.2).
3. Have students prepare samples of natural resources (E21.3.1).
4. Arrange field trips for students to visit selected sites and complete a checklist identifying all of the natural resources of the site. Discuss students' differences with a master list for the site (E21.3.1-E21.3.4).

SELECTED TOOLS AND MATERIALS

Soil probe
Instructor-prepared list of natural resources
Instructor-prepared pictures, sketches of natural resources

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Books:
Our Natural Resources, 5th ed., H.B. Kircher and Donald L. Wallace.

Teaching Materials:
National Forest Landscape Management: Timber, pp. 60-63, USDA, Forest Service.

CONTENT/CONCEPT

21. APPLYING GENERAL KNOWLEDGE OF NATURAL RESOURCES

TASK/COMPETENCY

21.4 Identify, by common and scientific name, the common grasses and plants found in Virginia

PROGRAM

AGRICULTURAL RESOURCES (03.0101)

COURSE

Natural Resources Management V (8044)

21.4

PERFORMANCE OBJECTIVE

P21.4 Given access to samples of grasses and plants, identify the common grasses and plants found in Virginia, according to their common and scientific name. At least 80 percent of the 20 specimens assembled for testing must be correctly identified on instructor-prepared worksheet.

SELECTED ENABLING OBJECTIVES

E21.4.1 Compile a list of the common grasses and plants found in Virginia.

E21.4.2 Secure drawings, pictures, or descriptions of each common grass and plant.

E21.4.3 Secure a sample of each common grass and plant and preserve samples.

E21.4.4 Identify each common grass and plant by giving the common and scientific name.

CRITERION-REFERENCED MEASURE

C21.1 Identify, by common and scientific name, the common grasses and plants in Virginia. Twenty specimens should be assembled by the class and teacher for study with at least 80 percent of the specimens identified by the student on the day of the test.

SELECTED INSTRUCTIONAL ACTIVITIES

1. Have students compile a list of the common grasses and plants of Virginia by their common and scientific names (E21.4.1).
2. Arrange class field trips to collect specimens of grasses and plants to be preserved and used for individual study (E21.4.3, E21.4.4).
3. Conduct spelling-bee type contests using pictures or specimens of grasses and plants to "spell down" contestants (E21.4.1-E21.4.4).

SELECTED TOOLS AND MATERIALS

Preserving materials for specimens
Grass and plant specimens
Shovel
Instructor-prepared worksheet on grasses and plants
Preserved specimens of grass and plant

SELECTED AUDIOVISUAL MATERIALS

None identified

SELECTED REFERENCES

Teaching Materials:
Selected Weeds of the United States, USDA, Agricultural Research Service.

SECTION 2.

PROGRAMS AND COURSES

The Natural Resources Management Program and courses are based on the task inventory presented in the preceding section. All programs and courses have been approved by the Virginia Department of Education. This section contains a course outline for secondary courses, with tasks sequenced in teaching order. The teaching order may vary considerably from one program to the next because of the non-sequential nature of the competencies.

Because of the lack of time, equipment, or facilities, it is unlikely that all of the tasks included in Section 1 or in the course material following the tasks will be taught in any secondary program. Also, it should be noted that some tasks are quite similar in nature. Therefore, if a student is competent in one, he or she probably is competent in another. Certain tasks could be eliminated, or individual students could accomplish different tasks to demonstrate the same competency.

SECONDARY PROGRAMS AND COURSES

PROGRAM TITLE: AGRICULTURAL RESOURCES
NATURAL RESOURCES MANAGEMENT CLUSTER

DESCRIPTION: Natural Resources Management is a (secondary) vocation course which is part of the Agricultural Resources program and involves the production, maintenance, harvesting, processing, and distribution of our natural resources. The course includes resources management, conservation, human relations, and leadership development topics. The study of career opportunities and the development of marketable skills through supervised occupational experiences are also a part of this program.

The primary purposes of the Natural Resources Management course of study are to:

A. To provide students job entry and/or marketable skills training in natural resources management and related occupations.
B. To provide students a broad base of occupational experiences and information upon which they can make a career decision.
C. To contribute to the fulfillment of the broad educational objectives set forth in the high school where this course is taught.

CIP CODE: 03.0101

SUGGESTED GRADE LEVEL: 10, 11, and 12

APPROVED COURSE	VA COURSE CODE	REPRESENTATIVE DOT CODE/TITLE	(FOR ALL COURSES)
Natural Resources Management III	8040	040.061-054	Soil Conservationist
Natural Resources Management IV	8042	406.687-010	Groundskeeper, parks and recreation
Natural Resources Management V	*8044	446.684-010	Fish hatchery worker
		451.687-010	Christmas tree farm worker
		452.364-010	Forester aide
		452.687-010	Forest worker
		452.687-018	Tree planter
		454.684-018	All-round logger
		869.567-010	Survey helper

PROGRAM OPTIONS: Option I: 8040, 8042

Option II: 8040, 8042, 8044

*All Agricultural Education V courses are advanced occupational preparation courses and are optional for completion of the program.

NATURAL RESOURCES MANAGEMENT III (8040)

COURSE DESCRIPTION: Natural Resources Management III is designed as a one-year, double-period, occupational preparation course offered at the tenth or eleventh grade levels. The course assists students in developing knowledge and skills required for employment in occupations in forestry and wildlife management, outdoor recreation, and air, soil, and water conservation. Because of the emphasis on different facets of natural resources management in different parts of the State, the course will vary to meet local needs and interests. This course includes instruction in forest production and management, wildlife, soil and water conservation, mechanics relating to the field, and leadership training.

PREREQUISITES: Agricultural Science and Mechanics II

GRADE LEVEL: 10 or 11

TASK/COMPETENCY SEQUENCE

1.1 Identify jobs available in Natural Resources Management
2.1 Demonstrate skills in communicating with others
3.1 Demonstrate ability to handle a cash transaction
6.1 Demonstrate knowledge of the environment, its pollution problems, and possible solutions
6.2 Describe the sources of water for home and industrial uses
6.3 List the various ways consumers use water
7.1 Estimate the percent of slope
8.1 Determine ration to feed fish
8.2 Develop a plan to provide food for animal and bird wildlife species
9.1 Identify, by common name, tree species native in region
9.2 Identify and name forest products
9.3 Produce Christmas trees
15.1 Demonstrate ability to paint buildings and equipment
15.2 Clean and sanitize buildings
16.1 Demonstrate vehicles and equipment applicable to Natural Resources Management III
17.1 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management III
18.1 Water plants
18.2 Aerate sod
18.3 Haul and spread topsoil
18.4 Prepare and apply a compost
18.5 Sterilize soil
18.6 Add mulch to new seedlings
18.7 Check plants for insects
18.8 Remove weeds and grasses from flower bed
18.9 Plant annual flowers

18.10 Plant flower bulbs
18.11 Wrap trees or shrubs to protect from weather
19.1 Demonstrate safety practices while boating
19.2 Demonstrate safety practices while hunting
19.3 Demonstrate safety practices while using tools and equipment
19.4 Identify safe storage mehtods for chemicals

NATURAL RESOURCES MANAGEMENT

COURSE OUTLINE	TASK/COMPETENCY CODE
I. Introducing Natural Resources Management	
School and department policies	None
B. Classroom/lab management	None
C. Safety	All Competencies
D. First aid	All Competencies
E. FFA	As applicable
II. Choosing and Entering a Career	
Identify jobs available in Natural Resources Management	P1.1
1. Define job title or occupational title	E1.1.1
2. Describe the field of Natural Resources Management	E1.1.2
3. Locate natural resources management occupational titles in the DOT	E1.1.3
4. Write job descriptions for natural resources management occupations	E1.1.4
5. Identify natural resources businesses or agencies in the community	E1.1.5
6. List occupational titles for natural resources management occupations in the community	E1.1.6
7. Classify job titles in each natural resources business or agency	E1.1.7
8. Identify educational and experiential requirements	E1.1.8
III. Developing Human Relations	
Demonstrate skills in communicating with others	P2.1
1. List the ways humans communicate	E2.1.1
2. Define communication	E2.1.2
3. Describe the communication model	E2.1.3
4. List the causes for breakdown in communication	E2.1.4
5. Demonstrate ability to follow oral and written instructions	E2.1.5

IV.	Managing a Natural Resources Business or Agency	
	Demonstrate ability to handle a cash transaction	P3.1
1.	Identify the denomination of money	E3.1.1
2.	Explain the relationship between each denomination of money	E3.1.2
3.	Compute state sales tax	E3.1.3
4.	Use basic mathematics to make change	E3.1.4
5.	Explain how to maintain an accounting system	E3.1.5
V.	Protecting the Environment	
A.	Demonstrate knowledge of the environment and its pollution	P6.1
1.	Define terminology	E6.1.1
2.	Explain importance of photosynthesis and respiration	E6.1.2
3.	Identify biogeochemical cycles	E6.1.3
4.	Describe pollution caused by nature and by people	E6.1.4
5.	List possible solutions to problems	E6.1.5
6.	Explain conservation techniques	E6.1.6
7.	Name alternate energy sources	E6.1.7
8.	Explain need for land-use planning	E6.1.8
B.	Describe sources of water	P6.2
1.	Identify ground water sources	E6.2.1
2.	Identify surface water sources	E6.2.2
3.	Explain or define ground and surface water sources	E6.2.3
4.	Explain availability of water source	E6.2.4
5.	Identify future trends	E6.2.5
6.	Determine feasibility of developing additional water sources	E6.2.6
C.	List the various ways consumers use water	P6.3
1.	List the ways water is used	E6.3.1
2.	Compare usage lists	E6.3.2
3.	Explain distinction between consumptive and nonconsumptive uses of water	E6.3.3
VI.	Planning and Managing Land Usage	
	Estimate percent of slope	P7.1
1.	Construct and/or secure slope finder	E7.1.1.1
2.	Outline procedures for using slope finder	E7.1.2
3.	Determine percent and direction of slope	E7.1.3
4.	Explain relationship of slope to land capability classification	E7.1.4

5.	Define terminology	E7.1.5
6.	Apply mathematical skills	E7.1.6
VII.	Managing Fish and Wildlife	
A.	Determine ration to feed fish	P8.1
1.	Determine balanced fish ration	E8.1.1
2.	Identify ingredients	E8.1.2
3.	Explain formulation of feed	E8.1.3
4.	Identify amount of feed to be fed	E8.1.4
5.	Determine proper feeding time	E8.1.5
6.	Determine whether fish are feeding, correct problems	E8.1.6
7.	Apply mathematical skills	E8.1.7
B.	Develop a plan to provide food	P8.2
1.	List ways of attracting wild animals/birds to a natural habitat	E8.2.1
2.	Identify plants or trees that provide cover/food	E8.2.2
3.	Determine natural food sources	E8.2.3
4.	List symptoms of wildlife starvation	E8.2.4
5.	Determine if additional plantings of food sources are necessary	E8.2.5
6.	Explain process of supplementing food sources	E8.2.6
VIII.	Managing the Forest	
A.	Identify tree species	P9.1
1.	Determine the common native trees	E9.1.1
2.	Locate reference material containing native trees	E9.1.2
3.	Compare reference material to observe characteristics	E9.1.3
4.	Demonstrate ability to use a key to identify tree	E9.1.4
5.	Determine most likely spot to find a particular tree	E9.1.5
6.	Spell common names correctly	E9.1.6
B.	Identify and name forest products	P9.2
1.	List the industries that require wood	E9.2.1
2.	Differentiate forest products	E9.2.2
3.	Identify common product uses for a particular species	E9.2.3

	C.	Produce Christmas trees	P9.3
	1.	Determine characteristics of a desirable site	E9.3.1
	2.	Select suitable varieties	E9.3.2
	3.	Purchase tree stock	E9.3.3
	4.	Plant trees	E9.3.4
	5.	Prune and shape trees	E9.3.5
	6.	Provide adequate protection	E9.3.6
	7.	Harvest, grade, tie trees	E9.3.7
	8.	Arrange for marketing	E9.3.8
	9.	Keep adequate records	E9.3.9
	10.	Define terminology	E9.3.10
	11.	Apply mathmetical skills	E9.3.11
IX.		Constructing and Maintaining Facilities	
	A.	Demonstrate ability to paint buildings and equipment	P15.1
	1.	Prepare surfaces to be painted	E15.1.1
	2.	Mask equipment and building interiors, as needed	E15.1.2
	3.	Prime surfaces as required	E15.1.3
	4.	Select proper paint coating	E15.1.4
	5.	Assemble paint equipment	E15.1.5
	6.	Demonstrate correct operating procedures for hand or power equipment	E15.1.6
	7.	Remove paint from areas not to be covered	E15.1.7
	8.	Clean equipment	E15.1.8
	9.	Store equipment and supplies	E15.1.9
	10.	Define terminology	E15.1.10
	B.	Clean and sanitize buildings	P15.2
	1.	Assemble needed cleaning tools and supplies	E15.2.1
	2.	Dust interior of room and furniture	E15.2.2
	3.	Clean walls, partitions, and furniture	E15.2.3
	4.	Sweep room and clean floor	E15.2.4
X.		Operating Vehicles and Equipment	
		Demonstrate ability to operate vehicles and equipment	P16.1
	1.	Explain general safety rules	E16.1.1
	2.	Demonstrate knowledge of operator's manual	E16.1.2
	3.	Describe starting procedures and operating controls	E16.1.3
	4.	Determine proper and improper functioning	E16.1.4

		5.	Perform necessary adjustments under field conditions	E16.1.5
		6.	Determine capabilities of vehicles and equipment	E16.1.6
		7.	Identify specific safety rules	E16.1.7
		8.	Define terminology	E16.1.8
XI.	Maintaining Vehicles and Equipment			
			Demonstrate ability to maintain vehicles and equipment	P17.1
		1.	Identify general safety rules	E17.1.1
		2.	Demonstrate knowledge of operator's manual	E17.1.2
		3.	Describe maintenance procedures	E17.1.3
		4.	Secure needed supplies	E17.1.4
		5.	Perform needed maintenance requirements	E17.1.5
		6.	Identify specific safety rules	E17.1.6
		7.	Define terminology	E17.1.7
		8.	Apply mathematical skills	E17.1.8
XII.	Groundskeeping			
	A.		Water plants	P18.1
		1.	Determine amount of water needed	E18.1.1
		2.	Determine soil type and slope for outdoor plants and potting media for indoor plants	E18.1.2
		3.	Check plants	E18.1.3
		4.	Check equipment	E18.1.4
		5.	Set up watering equipment; determine coverage needed	E18.1.5
		6.	Regulate water flow for adequate application	E18.1.6
		7.	Examine plants to determine watering schedule	E18.1.7
		8.	Apply mathematical skills	E18.1.8
	B.		Aerate sod	P18.2
		1.	Demonstrate knowledge of operator's manual	E18.2.1
		2.	Determine direction of travel	E18.2.2
		3.	Aerate entire compacted area	E18.2.3
		4.	Clean and repair tires	E18.2.4
		5.	Define terminology	E18.2.5
	C.		Haul and spread topsoil	P18.3
		1.	Determine area needing topsoil and required depth	E18.3.1
		2.	Place fill stakes at proper intervals	E18.3.2
		3.	Choose route for hauling	E18.3.3
		4.	Load, transport, dump topsoil	E18.3.4
		5.	Spread topsoil	E18.3.5
		6.	Level topsoil	E18.3.6

D.	Prepare and apply a compost	P18.4
1.	Prepare a compost using appropriate procedure	E18.4.1
2.	Apply compost using appropriate procedure	E18.4.2
3.	Define terminology	E18.4.3
E.	Sterilize soil	P18.5
1.	Prepare soil for sterilization	E18.5.1
2.	Identify recommended amount of fumigant or chemical	E18.5.2
3.	Place warning signs in noticable locations	E18.5.3
4.	Identify manufacturer's safety procedures	E18.5.4
5.	Demonstrate ability to use appropriate coverings	E18.5.5
6.	Explain time restrictions	E18.5.6
7.	Define terminology	E18.5.7
F.	Add mulch to new seedlings	P18.6
1.	Prepare soil for mulch	E18.6.1
2.	Spread mulch	E18.6.2
3.	Add enough mulch to allow for settling	E18.6.3
4.	Smooth top of mulch	E18.6.4
5.	Define terminology	E18.6.5
G.	Check plants for insects	P18.7
1.	Determine overall appearance of plant-noting abnormalities	E18.7.1
2.	Describe plant surfaces and ground around plant	E18.7.2
3.	Identify insect damage	E18.7.3
4.	Identify insect causing damage	E18.7.4
5.	Describe beneficial and harmful insects	E18.7.5
H.	Remove weeds and grasses from flower beds	P18.8
1.	Determine if weeds can be easily removed	E18.8.1
2.	Demonstrate ability to use hoe or handweeder to uproot weeds or grasses	E18.8.2
3.	Rake weeds or grasses	E18.8.3
4.	Dispose of weeds or grasses	E18.8.4
5.	Add new soil or mulch	E18.8.5

I.		Plant annual flowers	P18.9
	1.	Check soil for proper moisture and composition	E18.9.1
	2.	Dig hole	E18.9.2
	3.	Remove plant following proper procedure	E18.9.3
	4.	Pull root ends loose from ball on compacted plants	E18.9.4
	5.	Set plant properly	E18.9.5
	6.	Water plants	E18.9.6
	7.	Provide shade if needed	E18.9.7
	8.	Define terminology	E18.9.8
J.		Plant flower bulbs	P18.10
	1.	Remove bulb from package or storage bed properly	E18.10.1
	2.	Dig hole	E18.10.2
	3.	Place bulb in hole properly	E18.10.3
	4.	Fill in hole	E18.10.4
	5.	Provide adequate moisture	E18.10.5
K.		Wrap trees or shrubs to protect from weather	P18.11
	1.	Determine areas of trees and shrubs vulnerable to winter weather	E18.11.1
	2.	Select a suitable wrapping material	E18.11.2
	3.	Demonstrate knowledge of manufacturer's recommendation in applying material	E18.11.3
	4.	Determine if wrappings are secure	E18.11.4

XIII. Implementing Safety Practices

A.		Demonstrate safety practices while boating	P19.1
	1.	Identify human factors affecting boating safety	E19.1.1
	2.	Identify general safety rules	E19.1.2
	3.	Identify specific safety rules	E19.1.3
	4.	Define terminology	E19.1.4
	5.	Determine adverse weather conditions	E19.1.5
	6.	Describe rescue procedures	E19.1.6
	7.	Demonstrate ability to administer first-aid treatment	E19.1.7
	8.	Explain the importance of swimming ability	E19.1.8
B.		Demonstrate safety practices while hunting	P19.2
	1.	Identify human factors affecting hunter safety	E19.2.1
	2.	Identify general safety rules	E19.2.2
	3.	Identify specific safety rules	E19.2.3

	4.	Define terminology	E19.2.4
	5.	Determine adverse weather conditions	E19.2.5
	6.	Demonstrate ability to administer first-aid treatment	E19.2.6
C.	Demonstrate safety practices while using tools and equipment		P19.3
	1.	Identify human factors affecting tool and equipment safety	E19.3.1
	2.	Identify general safety rules	E19.3.2
	3.	Identify tools and equipment used in student's placement	E19.3.3
	4.	Demonstrate knowledge of information in operator's manual	E19.3.4
	5.	Identify specific safety rules	E19.3.5
	6.	Explain procedures to follow to maintain tools and equipment	E19.3.6
	7.	Define terminology	E19.3.7
D.	Identify safe storage methods for chemicals		P19.4
	1.	Identify properties of chemicals to be stored	E19.4.1
	2.	Describe properly located storage	E19.4.2
	3.	Describe characteristics of a storage facility	E19.4.3
	4.	Identify warning signs to be posted	E19.4.4
	5.	Describe proper arrangement of chemicals	E19.4.5
	6.	Identify damaged or improper containers	E19.4.6
	7.	List specific safety measures	E19.4.7

NATURAL RESOURCES MANAGEMENT IV (8042)

COURSE DESCRIPTION: Natural Resources Management IV is designed as a one-year, double-period occupational preparation course offered at the eleventh or twelfth grade levels. The course includes instruction in forest protection and harvesting, fish pond ecology and management, planning and operating a hunting and fishing preserve, wildlife ecology and management, soil and water management systems, servicing and operating large power equipment, and leadership training.

PREREQUISITES: Natural Resources Management III

GRADE LEVEL: 11 or 12

TASK/COMPETENCY SEQUENCE

1.2 Describe the main occupations in Natural Resources Management
1.4 Write a letter of application
1.5 Complete a job application
1.6 Construct a personal data sheet or resume
1.7 Demonstrate personal interviewing skills
2.2 Evaluate aspects of personal appearance or physical traits which may hinder an individual's employability
2.3 Define and identify the importance of etiquette
3.2 Demonstrate knowledge of credit and loan application.
3.3 Set up a partial budget for a natural resources enterprise
3.4 Identify facility needs for a natural resources enterprise
3.5 Maintain an accurate inventory
6.4 Describe how agriculture and the ecosystem are interrelated
6.5 Describe how agriculture and the environment are interrelated
6.6 Identify air pollutants and describe their effects on the environment
6.7 Select the best method to control air pollution
6.8 Identify common vegetation materials used for resource conservation
6.9 Identify practices to control soil erosion
6.10 Identify and explain the various methods of water treatment
6.11 Identify water pollutants and describe their effect on the environment
6.12 Select the best method to control water pollution
7.2 Classify land according to its capability to produce
7.3 Prepare seedbeds
7.4 Describe weed control measures
7.5 Outline plans for stockwater ponds
7.6 Identify procedures for improving the soil
7.7 Explain the effects of zoning
7.8 Demonstrate ability to use the pH Test Kit

TASK/COMPETENCY SEQUENCE

8.3 Seed, mulch, and fertilize waterholes
8.4 Identify game, waterfowl, and fish
8.5 Write plans for establishing a fish pond
8.6 Develop recommendations for maintaining ponds
8.7 Write a plan to manage a stream or lake
9.4 Calculate volume of pulpwood
9.5 Estimate the volume of standing timber on a given tract
9.6 Demonstrate knowledge of tree fertilization
10.1 Demonstrate knowledge of fire control measures
11.1 Locate markets for forest products
11.2 Remove debris from work area
13.1 Demonstrate ability to clean and refill pools
13.2 Develop a plan to establish living fences
14.1 Make linear measurements by pacing
14.2 Carry and set stakes
14.3 List the uses of surveys
15.3 Construct fences
15.4 Demonstrate ability to repair roads and driveways
15.5 Demonstrate ability to pour and repair concrete
16.2 Demonstrate ability to operate vehicles and equipment applicable to Natural Resources Management IV
17.2 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management IV
18.12 Compile information necessary for purchasing chemicals for a specific use
18.13 Apply chemical treatment to diseased plants
18.14 Apply chemical treatment to insect-infested plants
18.15 Apply weed-killing compounds to lawns
18.16 Prune and trim trees
19.5 Develop a list of safety regulations for workers
19.6 Demonstrate knowledge of administering first aid to an ill or injured sportsperson
21.1 Define terms commonly used in natural resources management
21.2 Locate and interpret sources of weather information

NATURAL RESOURCES MANAGEMENT IV (8042)

COURSE OUTLINE	TASK/COMPETENCY CODE
I. Introducing the Course	
A. School and department policies	None
B. Classroom/lab management	None
C. Safety review	All competencies
D. FFA	As applicable
II. Choosing and Entering a Career	
A. Describe main occupations	P1.2
1. Find reference materials	E1.2.1
2. Locate relevant information	E1.2.2
3. Organize information into written form	E1.2.3
4. Use proper grammar, spelling, and vocabulary	E1.2.4
5. Write legibly	E1.2.5
B. Write a letter of application	P1.4
1. List information to be included	E1.4.1
2. Write formal letter of application	E1.4.2
3. Demonstrate knowledge of grammar, spelling, and vocabulary skills	E1.4.3
4. Demonstrate legible handwriting or typing skills	E1.4.4
C. Complete a job application	P1.5
1. List information required on job applications	E1.5.1
2. Secure and record personal information	E1.5.2
3. Demonstrate knowledge of grammar, spelling, and vocabulary skills	E1.5.3
4. Demonstrate legible handwriting or typing skills	E1.5.4
D. Construct a personal data sheet or resume	P1.6
1. List categories of information to be included	E1.6.1
2. Record work/educational experience	E1.6.2
3. Identify jobs which coincide with competencies mastered	E1.6.3
4. Demonstrate knowledge of grammar, spelling, and vocabulary skills	E1.6.4
5. Demonstrate legible handwriting or typing skills	E1.6.5

E. Demonstrate personal interviewing skills P1.7

1. Explain the purpose and importance of a job interview E1.7.1
2. Describe appropriate dress E1.7.2
3. List materials to take to an interview E1.7.3
4. List frequently asked questions E1.7.4
5. Explain courtesies to exhibit E1.7.5
6. List behaviors that may prevent a job from being offered E1.7.6
7. Describe and practice various interview techniques and procedures E1.7.7

III. Developing Human Relations

A. Evaluate aspects of personal appearance or physical traits P2.2

1. Compare the nature of work with physical traits E2.2.1
2. Analyze personal physical traits E2.2.2
3. List physical requirements in natural resources management E2.2.3
4. Explain the importance of maintaining good physical condition E2.2.4

B. Define and identify the importance of etiquette P2.3

1. Define etiquette E2.3.1
2. Describe importance of practicing proper etiquette E2.3.2
3. Relate importance of etiquette to job security and advancement E2.3.3
4. List and describe socially acceptable forms E2.3.4

IV. Managing a Natural Resources Management Business

A. Demonstrate knowledge of credit and loan application P3.2

1. Compile necessary information to obtain a loan E3.2.1
2. Identify necessary forms and documents E3.2.2
3. Determine method and schedule for repayment E3.2.3
4. Define terminology E3.2.4
5. Describe types of financing available E3.2.5
6. List and define three types of loans E3.2.6

B.	Set up a partial budget	
1.	Describe purposes and uses of a partial budget	E3.3.1
2.	Identify items of income and expense	E3.3.2
3.	List procedures to prepare a partial budget	E3.3.3
4.	Prepare partial budget format	E3.3.4
5.	Apply mathematical skills	E3.3.5
C.	Identify facility needs	P3.4
1.	Identify purposes(s) of proposed enterprise	E3.4.1
2.	Determine number of people to be accommodated at one time	E3.4.2
3.	List individual/group activities	E3.4.3
4.	Determine public health and safety facility needs	E3.4.4
5.	Determine refreshment, eating, and amusement needs	E3.4.5
6.	Determine equipment and maintenance storage needs	E3.4.6
7.	Determine livestock and wildlife facilities needs	E3.4.7
8.	Describe the most suitable location	E3.4.8
9.	Identify a construction schedule	E3.4.9
10.	Apply mathematical skills	E3.4.10
D.	Maintain an accurate inventory	P3.5
1.	Explain importance of inventory control	E3.5.1
2.	Develop materials or equipment identification system	E3.5.2
3.	Construct an inventory form	E3.5.3
4.	Describe procedure for conducting inventory	E3.5.4
5.	Conduct an inventory	E3.5.5
6.	Maintain proper records of the inventory	E3.5.6
7.	Define terminology	E3.5.7
8.	Apply mathematical skills	E3.5.8
V.	Protecting the Environment	
A.	Describe interrelation of agriculture and ecosystem	P6.4
1.	Define terminology	E6.4.1
2.	Identify benefits and losses	E6.4.2
3.	Explain relationship between modern agricultural practices and wildlife/plants	E6.4.3
4.	Describe effects upon water supply	E6.4.4

B.	Describe interrelation of agriculture and environment	P6.5
1.	Define terminology	E6.5.1
2.	Identify benefits and losses	E6.5.2
3.	Describe relationship between agriculture and environment	E6.5.3
4.	Determine the long-range effects of residues	E6.5.4
C.	Identify air pollutants and describe their effects on the environment	P6.6
1.	Identify characteristics of unpolluted air	E6.6.1
2.	Prepare list of air pollutants and their characteristics	E6.6.2
3.	Identify local sources of air pollutants	E6.6.3
4.	Identify common air pollutants	E6.6.4
5.	Research effects of air pollutant on the environment	E6.6.5
6.	Define terminology	E6.6.6
D.	Select best method to control air pollution	P6.7
1.	List reasons for controlling air pollution	E6.7.1
2.	Take a sample of air to discover air pollutants	E6.7.2
3.	Describe several air pollution control methods	E6.7.3
4.	Identify the laws and regulations enacted to control air pollution	E6.7.4
5.	Define terminology	E6.7.5
E.	Identify common vegetation materials used for resource conservation	P6.8
1.	Identify location of a source listing plants commonly used in resource conservation	P6.8.1
2.	Describe characteristics of vegetative material	P6.8.2
3.	Identify commonly used vegetative material	E6.8.3
4.	Identify application situations	E6.8.4
5.	Define terminology	E6.8.5
F.	Identify practices to control soil erosion	P6.9
1.	Define soil erosion	E6.9.1
2.	Describe major factors causing soil erosion	E6.9.2

		3.	List consequences of uncontrolled erosion	E6.9.3
		4.	Describe factors affecting rate of erosion	E6.9.4
		5.	Identify control practices	E6.9.5
		6.	Define terminology	E6.9.6
		7.	Apply mathematical skills	E6.9.7
	G.		Identify and explain methods of water treatment	P6.10
		1.	Identify and explain chlorination of water	E6.10.1
		2.	Define terminology	E6.10.2
		3.	Describe effects of storage on water	E6.10.3
		4.	Relate water storage systems to methods of water treatment	E6.10.4
	H.		Identify water pollutants and describe their effect on the environment	P6.11
		1.	Identify local sources of water pollution	E6.11.1
		2.	Research effects of a water pollutant on the environment	E6.11.2
		3.	Define terminology	E6.11.3
	I.		Select best method to control water pollution	P6.12
		1.	List reasons for controlling water pollution	E6.12.1
		2.	Collect water samples from various sources	E6.12.2
		3.	Explain water pollution control methods	E6.12.3
		4.	Describe laws and regulations enacted to control water pollution	E6.12.4
		5.	Define terminology	E6.12.5
VI.			Planning and Managing Land Usage	
	A.		Classify land according to capability to produce	P7.2
		1.	Define terminology	E7.2.1
		2.	Examine categories of capability classification	E7.2.2
		3.	Determine capability subclasses	E.7.2.3
		4.	Examine site and compare characteristics	E7.2.4
		5.	Compare ability of land to produce	E7.2.5

B.	Prepare seedbeds	P7.3
	1. List characteristics of a good seedbed	E7.3.1
	2. Determine when soil can be tilled	E7.3.2
	3. Identify advantages and disadvantages of plowing vs. minimum tillage	E7.3.3
	4. Identify equipment used in preparing seedbeds	E7.3.4
	5. Explain relationship of preparation of seedbed to crop planted	E7.3.5
	6. Define terminology	E7.3.6
C.	Describe weed control measures	P7.4
	1. Identify methods of weed control	E7.4.1
	2. Describe how weeds spread	E7.4.2
	3. Identify equipment used in weed control	E7.4.3
	4. Describe precautions to be followed	E7.4.4
	5. Define terminology	E7.4.5
D.	Outline plans for stockwater ponds	P7.5
	1. Describe characteristics of pond site	E7.5.1
	2. Determine size of pond required	E7.5.2
	3. List Soil Conservation service recommendations	E7.5.3
	4. Prepare plans and specifications	E7.5.4
	5. Apply mathematical skills	E7.5.5
E.	Identify procedures for improving soil	P7.6
	1. Define terminology	E7.6.1
	2. Apply mathematical skills	E7.6.2
	3. Provide description of area and soil analysis reports	E7.6.3
	4. List methods of soil improvement	E7.6.4
	5. Explain advantages and disadvantages	E7.6.5
	6. Identify procedures of soil improvement methods	E7.6.6
F.	Explain the effects of zoning	P7.7
	1. Define terminology	E7.7.1
	2. Determine differences in laws	E7.7.2
	3. Explain supervised occupational experience programs	E7.7.3
	4. Decide whether program is in compliance	E7.7.4
	5. Determine whether applying for variance justified	E7.7.5
G.	Demonstrate how to use the pH Test Kit	P7.8
	1. Define terminology	E7.8.1
	2. Collect soil sample	E7.8.2
	3. Follow directions in kit	E7.8.3
	4. Compare color of liquid with color chart	E7.8.4
	5. Identify the pH value	E7.8.5
	6. Determine how to raise or lower pH values	E7.8.6

VII. Managing Fish and Wildlife	
A. Seed, mulch, and fertilize waterholes	P8.3
1. Apply mathematical skills	E8.3.1
2. Locate waterholes suitable for bird habitats	E8.3.2
3. Provide suitable feed for the birds by seeding waterholes	E8.3.3
4. Apply mulch and fertilizer to the waterholes	E8.3.4
B. Identify game, waterfowl, and fish	P8.4
1. Compile a list of game, waterfowl, and fish species for identification	E8.4.1
2. Identify examples of written/pictorial descriptions of each species	E8.4.2
3. List major characteristics of each species	E8.4.3
4. Identify characteristics to distinguish species	E8.4.4
5. Describe natural habitat characteristics	E8.4.5
C. Write plans for establishing a fish pond	P8.5
1. Describe characteristics of a desirable pond site	E8.5.1
2. Determine minimum pond depth	E8.5.2
3. Identify soil properties at pond site	E8.5.3
4. Explain procedure for contacting resource persons to prepare plans and specifications	E8.5.4
5. Describe techniques required to prepare site for pond construction	E8.5.5
6. Construct pond	E8.5.6
7. Describe method of sealing ponds	E8.5.7
8. Explain procedure to establish vegetation to prevent erosion	E8.5.8
9. Determine stocking rate of desirable species	E8.5.9
10. Identify livesaving equipment	E8.5.10
11. Define terminology	E8.5.11
12. Apply mathematical skills	E8.5.12
D. Develop recommendations for maintaining a pond	P8.6
1. Perform necessary inspections	E8.6.1
2. Keep ground covers in good condition	E8.6.2
3. Provide protection to shoreline from wave action	E8.6.3
4. Control wildlife and insects at pond site	E8.6.4

	5.	Keep spillways and pipes free from debris	E8.6.4
	6.	Follow recommendations for fertilization and control of algae and weeds	E8.6.6
	7.	Determine availability of desirable species, control undesirable species	E8.6.7
	8.	Determine food availability	E8.6.8
	9.	Evaluate water quality	E8.6.9
	10.	Arrange for sufficient fishing	E8.6.10
	11.	Determine useability of life-saving equipment	E8.6.11
E.		Write a plan to manage a stream or lake	E8.7
	1.	Describe the necessary stream or lake inspections	E8.7.1
	2.	Determine how to establish and maintain ground covers and trees	E8.7.2
	3.	Explain importance of providing protection to shorelines from current and wave action	E8.7.3
	4.	List methods to control animals and insects	E8.7.4
	5.	Provide for litter and debris removal	E8.7.5
	6.	Determine possible public usages and plan appropriate facilities	E8.7.6
	7.	Explain procedures used to evaluate water quality and various other factors	E8.7.7
	8.	Identify recommendations for fertilization and control of algae and weeds	E8.7.8
	9.	Monitor usage by public	E8.7.9
	10.	Define terminology	E8.7.10
VIII.		Managing the Forest	
A.		Calculate the volume of pulpwood	P9.4
	1.	Define terminology	E9.4.1
	2.	Use tape to determine measurements	E9.4.2
	3.	Use Biltmore stick	E9.4.3
	4.	Convert measurements	E9.4.4
	5.	Apply mathematical skills	E9.4.5
B.		Estimate the volume of standing timber	P9.5
	1.	Define terminology	E9.5.1
	2.	List tools	E9.5.2
	3.	Describe usage of tools	E9.5.3
	4.	Perform mathematical calculations	E9.5.4
	5.	Explain concept of random and stratified sampling	E9.5.5

C. Demonstrate knowledge of tree fertilization	P9.6
1. Determine need	E9.6.1
2. Identify level of nutrients	E9.6.2
3. Describe effects of nutrients	E9.6.3
4. Identify methods used to time applications	E9.6.4
5. Determine amount/method of application	E9.6.5
6. Explain cost/benefit factors	E9.6.6
IX. Controlling and Preventing Forest Fires	
A. Demonstrate knowledge of fire control measures	P10.1
1. Recite and explain the 10 Standard Fire Fighting Orders	E10.1.1
2. Diagram chain of command in a fire-fighting crew	E10.1.2
3. Identify standards for passing physical fitness test	E10.1.3
4. Explain procedure to operate hand and/or power tools and equipment	E10.1.4
5. List potentially life-threatening/ property-damaging situations	E10.1.5
6. Explain fire triangle	E10.1.6
7. Define terminology	E10.1.7
X. Harvesting Forest Products	
A. Locate markets for forest products	P11.1
1. Identify local markets for logs and pulpwood	E11.1.1
2. Determine type of forest product accepted by local markets	E11.1.2
3. Determine market demand and impact of new supplier	E11.1.3
4. Determine prices paid by markets	E11.1.4
5. State special conditions to consider	E11.1.5
6. Select most profitable market, defend decision	E11.1.6
7. Define terminology	E11.1.7
8. Apply mathematical skills	E11.1.8
B. Remove debris from work area	P11.2
1. Clear working space	E11.2.1
2. Prepare getaway path	E11.2.2
3. Remove any debris interfering with saw cut	E11.2.3
4. Clip brush or saplings with axe	E11.2.4
5. Devise plan for debris removal	E11.2.5
6. Obtain necessary equipment for removal	E11.2.6

	7.	Clean work area of litter	E11.2.7
	8.	Place litter in suitable place for disposal	E11.2.8
	9.	Perform final clean-up	E11.2.9
XI.	Managing Recreational Enterprises		
A.	Demonstrate ability to clean and refill pools		P13.1
	1.	Drain pool	E13.1.1
	2.	Remove dirt from pool	E13.1.2
	3.	Clean pool surfaces	E13.1.3
	4.	Identify necessary repairs to pool surfaces	E14.1.4
	5.	Paint areas	E14.1.5
	6.	Clean overflow drain	E14.1.6
	7.	Rinse pool surfaces	E13.1.7
	8.	Close drain refilling pool to proper depth	E13.1.8
	9.	Apply proper amount of chlorine	E13.1.9
	10.	Observe safety precautions	E13.1.10
B.	Develop a plan to establish living fences		P13.2
	1.	Determine appropriate plant materials for living fences	E13.2.1
	2.	Determine local bird and wildlife species and coordinate with plant materials	E13.2.2
	3.	Assess proposed planting site to determine if plant material is appropriate	E13.2.3
	4.	Describe procedures to follow to prepare site for planting	E13.2.4
	5.	Identify method of placing plant materials in ground	E13.2.5
	6.	Identify needed care	E13.2.6
	7.	Explain required maintenance	E13.2.7
XII.	Surveying Land		
A.	Make linear measurements by pacing		P14.1
	1.	Measure 100 feet with tape	E14.1.1
	2.	Pace distance	E14.1.2
	3.	Determine average member of steps required	E14.1.3
	4.	Calculate the total acreage	E14.1.4
	5.	Define terminology	E14.1.5
	6.	Apply mathematical skills	E14.1.6
B.	Carry and set stakes		P14.2
	1.	Demonstrate ability to set stakes	E14.2.1
	2.	Set stakes in horizontal curve situations	E14.2.2
	3.	Set stakes in excavation or fill situations	E14.2.3

C. List the uses of surveys	P14.3
1. Define surveying	E14.3.1
2. Differentiate plane and geodetic surveying	E14.3.2
3. Describe land or boundary surveys	E14.3.3
4. Identify the uses of topographic surveys	E14.3.4
XIII. Constructing and Maintaining Facilities	
A. Construct fences	P15.3
1. Determine need for fence	E15.3.1
2. List types of fences and uses	E15.3.2
3. Calculate number of line posts	E15.3.3
4. Select anchor-post assembly	E15.3.4
5. Calculate costs of materials	E15.3.5
6. List procedures to follow in fence construction	E15.3.6
B. Demonstrate ability to repair roads and driveways	P15.4
1. Locate sunken areas or potholes	E15.4.1
2. Remove faulty base material	E15.4.2
3. Place a mixture of clay in roadbed following appropriate instruction	E15.4.3
4. Follow instructions for placing asphalt, concrete, or gravel	E15.4.4
5. Evaluate roadway to determine strength of repair	E15.4.5
C. Demonstrate ability to pour and repair concrete	P15.5
1. Select necessary materials, tools, and equipment	E15.5.1
2. Determine usage of concrete	E15.5.2
3. Prepare or construct forms	E15.5.3
4. Mix materials	E15.5.4
5. Spread concrete in form	E15.5.5
6. Finish and cure concrete	E15.5.6
7. Remove forms and repair	E15.5.7
8. Apply mathematical skills	E15.5.8
XIV. Operating Vehicles and Equipment	
A. Demonstrate ability to operate vehicles and equipment	P16.2
1. Explain general safety rules	E16.2.1
2. Demonstrate knowledge of operator's manual	E16.2.2
3. Describe starting procedures and operating controls	E16.2.3
4. Determine proper and improper functioning	E16.2.4

5.	Perform necessary adjustments under field conditions	E16.2.5
6.	Determine capabilities of vehicles or equipment	E16.2.6
7.	Identify specific safety rules	E16.2.7
8.	Define terminology	E16.2.8

XV. Maintaining Vehicles and Equipment

	Demonstrate ability to maintain vehicles and equipment	P17.2
1.	Identify general safety rules	E17.2.1
2.	Demonstrate knowledge of operator's manual	E17.2.2
3.	Describe maintenance procedures	E17.2.3
4.	Secure needed supplies or parts	E17.2.4
5.	Perform needed maintenance requirements	E17.2.5
6.	Identify specific safety rules	E17.2.6
7.	Define terminology	E17.2.7
8.	Apply mathematical skills	E17.2.8

XVI. Groundskeeping

A.	Compile information necessary for purchasing chemicals	P18.12
1.	Describe landscaped area	E18.12.1
2.	Locate appropriate reference literature	E18.12.2
3.	Determine specific need for chemicals	E18.12.3
4.	Identify literature regarding common insects and diseases, recommended chemicals, and application rates	E18.12.4
5.	List chemical and application rate for a specific usage	E18.12.5
6.	List chemicals to be purchased	E18.12.6
7.	Compute costs of chemicals to be purchased	E18.12.7
8.	Define terminology	E18.12.8
B.	Apply chemical treatment to diseased plants	P18.13
1.	Determine proper chemical	E18.13.1
2.	Explain instructions on container label	E18.13.2
3.	Identify existing weather conditions to determine if spray can be applied	E18.13.3
4.	Prepare equipment and chemical mixture	E18.13.4
5.	Demonstrate application procedures	E18.13.5
6.	Dispose of chemical container and excess chemical	E18.13.6

	7.	Store chemical safely	E18.13.7
	8.	Clean and store spray equipment	E18.13.8
	9.	Wash exposed skin areas	E18.13.9
C.	Apply chemical treatment to insect-infested plants		P18.14
	1.	Determine proper chemical	E18.14.1
	2.	Explain instructions on container label	E18.14.2
	3.	Identify existing weather conditions to determine if spray can be applied	E18.14.3
	4.	Prepare equipment and chemical mixture	E18.14.4
	5.	Demonstrate application procedures	E18.14.5
	6.	Dispose of chemical container and excess chemical	E18.14.6
	7.	Store chemical safely	E18.14.7
	8.	Clean and store spray equipment	E18.14.8
	9.	Wash exposed skin areas	E18.14.9
D.	Apply weed-killing compounds to lawn		P18.15
	1.	Demonstrate knowledge of safety practices	E18.15.1
	2.	Identify weed(s) present in lawn	E18.15.2
	3.	Determine correct herbicide to purchase	E18.15.3
	4.	Describe proper method(s) of chemical application	E18.15.4
	5.	Determine proper time to apply chemical	E18.15.5
	6.	Explain chemical effects upon weeds and desirable lawn grasses	E18.15.6
	7.	Store excess chemical properly	E18.15.7
	8.	Clean and store spray equipment	E18.15.8
	9.	Define terminology	E18.15.9
E.	Prune and trim trees		P18.16
	1.	Describe shape	E18.16.1
	2.	Remove suckers and low branches	E18.16.2
	3.	Eliminate competing trunks	E18.16.3
	4.	Determine best branches	E18.16.4
	5.	Eliminate rubbing/inward-growing branches	E18.16.5
	6.	Remove branch, leaving no stem	E18.16.6
	7.	Remove large branches, using safety cut	E18.16.7
	8.	Demonstrate ability to use tree wound paint	E18.16.8

XVII. Implementing Safety Practices

A. Develop a list of safety regulations for workers P19.5

1. Demonstrate knowledge of the operator's manual concerning specific precautions E19.5.1
2. Determine workers' familarity with equipment operation E19.5.2
3. Write safety language clearly E19.5.3

B. Demonstrate knowledge of administering first aid E19.6

1. Identify symptoms of illness E19.6.1
2. Identify supplies in first aid kit E19.6.2
3. Identify common wounds, fractures, and abrasions E19.6.3
4. Identify first, second, and third degree burns E19.6.4
5. List appropriate procedures for treating wounds, fractures, abrasions, and burns E19.6.5
6. Determine the need for CPR E19.6.6
7. List symptons and appropriate treatment for exhaustion, shock, hypothermia, heat stroke, and drug overdose E19.6.7
8. List symptom and treatment for various bites E19.6.8
9. Identify practices of transportation for the injured E19.6.9
10. Define terminology E19.6.10

XVIII. Applying General Knowledge of Natural Resources

A. Define commonly used terms P21.1

1. List commonly used terms E21.1.1
2. Locate sources for definition E21.1.2
3. Formulate definition in own words E21.1.3
4. Demonstrate ability to use terms in daily vocabulary E21.1.4

B. Locate and interpret sources of weather information P21.2

1. Compile a list of weather information sources E21.2.1
2. List advantages and disadvantages of each E21.2.2

3.	Explain function of weather instruments	E21.2.3
4.	Identify weather conditions by observation	E21.2.4
5.	Explain symbols used in weather forcasting and maps	E21.2.5
6.	Describe and relate significance of various cloud formations	E21.2.6
7.	Define terminology	E21.2.7

NATURAL RESOURCES MANAGEMENT V (8044)

COURSE DESCRIPTION: Natural Resources Management V is a one-year, advanced, optional, occupational preparation course offered at the twelfth grade level. Much of the instruction may be provided through individualized instruction. Major learning areas may include instruction in processing forest products and lumber grading; in determining the feasibility of establishing, financing, and managing a business such as forestry, outdoor recreation, wildlife, and urban conservation. Based upon interests, students may receive instruction in developing and operating campgrounds, hiking and riding trails, riding stables, marinas, vacation farms, and farm ponds. Operation and maintenance of equipment is also emphasized. Leadership training is an important part of instruction.

PREREQUISITES: NATURAL RESOURCES MANAGEMENT IV

GRADE LEVEL: 12

TASK/COMPETENCY SEQUENCE

1.3 Select a tentative occupation
1.8 Write a follow-up letter of appreciation
1.9 Complete a placement agreement
2.4 Exhibit positive human relations traits
2.5 Identify the basic human needs which play a part in worker motivation
2.6 Maintain effective relations between and/or among fellow employees
2.7 Maintain effective supervisory relations with employee
2.8 Maintain effective relations with employer/firm
2.9 Make a decision, using the decision-making process
3.6 Demonstrate ability to keep employment records
3.7 Demonstrate knowledge of employee safety regulations and standards
3.8 Determine insurance needs
3.9 Prepare requisitions
3.10 Maintain accurate records of a natural resources enterprise
3.11 Maintain field inspection reports
3.12 Write a business letter
3.13 Maintain an organized filing system
3.14 Evaluate attitudes regarding change in work routines
4.1 Determine most effective methods of promoting natural resources enterprises
4.2 Develop a public relations program for a specific enterprise

4.3 Write newspaper advertisements and articles for publication
4.4 Prepare a natural resources enterprise exhibit
4.5 Present demonstrations to promote a natural resources enterprise
5.1 Interpret laws pertaining to wildlife
5.2 Demonstrate knowledge of various laws pertaining to public facilities operation
5.3 Demonstrate knowledge of compliance with federal and state laws on fishing and boating
5.4 Write a sales contract
5.5 Describe the work of the Environmental Protection Agency
6.13 Make recommendations on good sanitation practices and principles
6.14 Describe federal and state agencies responsible for protecting the environment
6.16 Interpret the various programs of the soil conservation agencies
6.17 Analyze a sample of water
6.18 Estimate the water needs for a farm or natural resource enterprise
7.9 Identify alternative land treatment plans
7.10 Develop farm land-use plans
7.11 Interpret land-use maps
8.8 Propagate fish
8.9 Keep records of fish
8.10 Determine proper stocking rate in ponds
8.11 Identify elements for maintenance of a marsh for wildlife habitat
8.12 Raise game birds
8.13 Explain propagation of game animals
9.7 Identify regeneration techniques necessary for the continuous growth of trees
9.8 Design plans to establish forest roads
9.9 Develop a plan for the management of a forest
9.10 Plan a timber stand improvement project of planting, thinning, and pruning a stand of uneven-aged or even-aged forests
9.11 Manage a forest harvesting plot
10.2 Describe the location of a forest fire, using Forest Service terminology
10.3 Write a control program for a fire
10.4 Conduct safety training exercises and demonstrate being responsible for others in fire control
10.5 Prepare publicity showing how people can prevent timber, forest, and grass fires
11.3 Select timber for purchase
11.4 Plan logging activities
11.5 Analyze the purchase of equipment
11.6 Outline the procedure for supervising the loading of logs
11.7 Outline the procedure for supervising the unloading of logs
11.8 Develop a plan to deliver forest products to manufacturing sites
11.9 Demonstrate ability to fell trees according to cutting patterns, using chain saw
11.10 Demonstrate ability to limb and top felled trees
11.11 Make bucking cuts
13.3 Inspect recreational areas
13.4 Describe the procedures involved in promoting, organizing, and conducting a hunting and/or fishing expedition
13.5 Direct and lead people participating in indoor and outdoor recreation
13.6 Advise others on navigational methods

13.7 Develop rules for campgrounds
13.8 Order weekly campground supplies
13.9 Locate trails, considering scenery and grades
13.10 Plan sled and snowmobile areas
13.11 Select method to control insects in camping areas
14.4 Set up and operate surveying instruments
14.5 Adjust and clean surveying instruments
14.6 Identify and correct malfunctions of surveying instruments
14.7 Locate and stake a terrace line
14.8 Determine field area of specific plots of land in acres
15.6 Demonstrate ability to build a masonry retaining wall
15.7 Build a stone wall
15.8 Demonstrate knowledge and ability in performing subjourney-level skills in carpentry
15.9 Demonstrate knowledge and ability in performing subjourney-level skills in electricity
15.10 Demonstrate knowledge and ability in performing subjourney-level skills in plumbing
16.3 Demonstrate ability to operate vehicles and equiment applicable to Natural Resources Management V
17.3 Demonstrate ability to maintain vehicles and equipment applicable to Natural Resources Management V
17.4 Service various types of equipment drives
17.5 Attach accessory equipment to basic power unit
18.17 Develop fertilization schedules
20.1 Demonstrate ability to patrol assigned area
21.3 Identify and list the natural resources of a given site
21.4 Identify, by common and scientific name, the common grasses and plants found in Virginia

NATURAL RESOURCES MANAGEMENT V (8044)

COURSE OUTLINE	TASK/COMPETENCY CODE
I. Introducing the Course	
A. School and department policies	None
B. Classroom/lab management	None
C. Safety review	All competencies
D. FFA	As applicable
II. Choosing and Entering a Career	
A. Select a tentative occupation	P1.3
1. Evaluate personal career goals	E1.3.1
2. Describe decision-making process	E1.3.2
3. Select a tentative occupation, using decision-making process	E1.3.3
B. Write a follow-up letter of appreciation	P1.8
1. List information to be included in follow-up letter	E1.8.1
2. Explain purpose of a formal follow-up letter	E1.8.2
3. Demonstrate knowledge of grammar, spelling, and vocabulary skills	E1.8.3
4. Demonstrate legible handwriting or typing skills	E1.8.4
C. Complete a placement agreement	P1.9
1. Review placement form and obtain necessary information	E1.9.1
2. Determine whether employer will aid in completing required competencies	E1.9.2
3. Visit work station and prospective employer	E1.9.3
4. Determine expectations of employer and cooperating teacher	E1.9.4
III. Developing Human Relations	
A. Exhibit positive human relations traits	P2.4
1. Define human relations	E2.4.1
2. List acceptable human relations techniques	E2.4.2
3. Identify relationship between positive human relations and employability	E2.4.3

	4.	Explain importance of positive human relations	E2.4.4
B.		Identify basic human needs which play a part in worker motivation	P2.5
	1.	List basic human needs in order of attainment	E2.5.1
	2.	Define and describe the categories of basic human need	E2.5.2
	3.	Explain the relationship of the attainment of human needs to worker motivation	E2.5.3
C.		Maintain effective relations	P2.6
	1.	Explain importance of developing a positive attitude	E2.6.1
	2.	Define marketable personality	E2.6.2
	3.	Explain importance of having tolerance for others	E2.6.3
	4.	List methods of getting along with others	E2.6.4
D.		Maintain effective supervisory relations	P2.7
	1.	Identify positive work attitudes	E2.7.1
	2.	List positive human relations skills	E2.7.2
	3.	Describe responsibility of supervisor to employee	E2.7.3
	4.	List expectations of supervisor for employee	E2.7.4
E.		Maintain effective relations with employer/firm	P2.8
	1.	Explain the importance of positive work attitudes	E2.8.1
	2.	List four positive human relations skills	E2.8.2
	3.	Explain the role of employer to employee	E2.8.3
	4.	Describe responsibility of worker to supervisor	E2.8.4
	5.	Describe responsibility of worker to employing firm	E2.8.5
F.		Make a decision, using the decision-making process	P2.9
	1.	Gather information on the results of a decision	E2.9.1
	2.	List alternative decisions	E2.9.2
	3.	List advantages and disadvantages of each alternative	E2.9.3
	4.	Make appropriate decision	E2.9.4

IV. Managing a Natural Resources Business

A. Demonstrate ability to keep employment records P3.6

1. List necessary employment records to keep E3.6.1
2. Explain rules concerning employee records E3.6.2
3. Prepare employees' payroll checks E3.6.3
4. Record and prepare detailed statements for employer, employee and government agencies E3.6.4
5. Define terminology E3.6.5
6. Apply mathematical skills E3.6.6

B. Demonstrate knowledge of employee safety regulations P3.7

1. List applicable laws pertaining to employee safety E.3.7.1
2. Identify employer's policies pertaining to employee safety E3.7.2
3. Determine case situations where a law applies E3.7.3
4. Explain procedure to inform employees of inappropriate behavior E3.7.4
5. Explain procedure to instruct employees on the correct procedure to follow E3.7.5
6. Observe employees to determine whether safety practices are being followed E3.7.6

C. Determine insurance needs P3.8

1. Explain the risk and exposure to liabilities and accidents covered by insurance E3.8.1
2. Determine value of business E3.8.2
3. Evaluate limits of liability needs E3.8.3
4. Identify and compare available insurance rates and coverage E3.8.4
5. Obtain interpretation of insurance coverages E3.3.5
6. Determine adequate coverage to purchase E3.8.6
7. Define terminology E3.8.7
8. Apply mathematical skills E3.8.8

D.	Prepare requisitions	P3.9
1.	Determine data needed to prepare requisition	E3.9.1
2.	Secure additional information to complete requisition	E3.9.2
3.	Write or type necessary information onto requisition	E3.9.3
4.	Obtain appropriate signatures	E3.9.4
5.	File requisition in appropriate location	E3.9.5
6.	Follow up requisition if merchandise is not received	E3.9.6
7.	Define terminology	E3.9.7
8.	Apply mathematical skills	E3.9.8
E.	Maintain accurate records	P3.10
1.	Examine reports and determine types of data to be collected	E3.10.1
2.	Identify schedule for recording data and completing forms	E3.10.2
3.	Determine need for specific records	E3.10.3
4.	Fill out forms correctly	E3.10.4
5.	Demonstrate use of correct grammar, vocabulary, and spelling	E3.10.5
6.	Apply mathematical skills	E3.10.6
F.	Maintain field inspection reports	P3.11
1.	Identify field inspection reports to be kept	E3.11.1
2.	Describe terminology to be included	E3.11.2
3.	Identify schedule for completing reports	E3.11.3
4.	Record content accurately	E3.11.4
5.	Develop and maintain filing system	E3.11.5
6.	Write legibly or type	E3.11.6
7.	Demonstrate use of correct grammar, vocabulary, and spelling	E3.11.7
8.	Apply mathematical skills	E3.11.8
G.	Write a business letter	P3.12
1.	List components of business letter	E.3.12.1
2.	Explain correct business letter style	E3.12.2
3.	Identify parts of a letter	E3.12.3
4.	Describe appropriate message	E3.12.4
5.	Type letter	E3.12.5
6.	Define terminology	E3.12.6

	H.		Maintain an organized filing system	P3.13
		1.	Identify systems used for filing	E3.13.1
		2.	Select appropriate filing system	E3.13.2
		3.	Maintain up-to-date files	E3.13.3
		4.	Explain required organizational skills	E3.13.4
	I.		Evaluate attitudes regarding change in work routines	P3.14
		1.	Explain importance of adaptive behavior	E3.14.1
		2.	Describe situations requiring adaptive behavior	E3.14.2
		3.	Identify methods for dealing with changing job situations	P3.14.3
		4.	Describe methods to facilitate change on the job	E3.14.4
		5.	Explain how an individual's personality impedes change	E3.14.5
V.			Advertising and Promoting	
	A.		Determine most effective methods of promotion	P4.1
		1.	List methods of promoting an enterprise	E4.1.1
		2.	Conduct research on the effectiveness of a promotion method	E4.1.2
		3.	Define terminology	E4.1.3
	B.		Develop a public relations program	P4.2
		1.	Identify need for a public relations program	E4.2.1
		2.	Determine available resources that can be committed to the program	E4.2.2
		3.	Identify items to be used in campaign	E4.2.3
		4.	Produce items needed for program	E4.2.4
		5.	Explain how to conduct the public relations program properly	E4.2.5
		6.	Identify methods used to assess effectiveness of public relations program	E4.2.6

C.	Write newspaper advertisements and articles	P4.3
1.	Select a newspaper with appropriate subscribing audience	E4.3.1
2.	Identify a needed advertisement or article	E4.3.2
3.	Prepare for publication	E4.3.3
4.	Select best location within newspaper	E4.3.4
5.	Explain how to use a cost-effective amount of space	E4.3.5
6.	Use correct format for submitting newspaper article	E4.3.6
7.	Use correct grammar, spelling, and vocabulary	E4.3.7
8.	Define terminology	E4.3.8
D.	Prepare an exhibit	P4.4
1.	Prepare schedule of appearances for exhibit	E4.4.1
2.	Write plans for exhibit transportation, set-up, and maintenance	E4.4.2
3.	Determine and schedule needed personnel	E4.4.3
4.	Identify procedure for training personnel to greet public	E4.4.4
5.	Keep area around the exhibit free of litter	E4.4.5
E.	Present demonstrations	P4.5
1.	Determine content	E4.5.1
2.	Develop a written outline	E4.5.2
3.	Assemble needed materials	E4.5.3
4.	List steps to follow for demonstration	E4.5.4
5.	Describe how to involve the audience	E4.5.5
6.	Prepare answers to anticipated questions	E4.5.6
7.	Determine suitable time limits	E4.5.7
VI.	Applying Legal Aspects	
A.	Interpret laws pertaining to wildlife	P5.1
1.	Identify reference materials pertaining to wildlife laws	E5.1.1
2.	List important factors to consider for case situations	E5.1.2
3.	Explain law(s) pertaining to cases	E5.1.3
4.	Describe appropriate action to be taken	E5.1.4
5.	Define terminology	E5.1.5

	B.	Demonstrate knowledge of various laws	P5.2
		1. Identify laws pertaining to public facilities operation	E5.2.1
		2. Explain intent of each law	E5.2.2
		3. Determine compliance or non-compliance with the laws	E5.2.3
		4. Explain importance of informing facility operators of appropriate laws	E5.2.4
	C.	Demonstrate knowledge of compliance with laws on fishing and boating	P5.3
		1. Secure appropriate current fishing regulations	E5.3.1
		2. Describe fishing license requirements	E5.3.2
		3. Explain fishing regulations	E5.3.3
		4. Identify laws regulating boating	E5.3.4
		5. Explain laws to individuals and groups	E5.3.5
	D.	Write a sales contract	P5.4
		1. Describe essential elements of a sales contract	E5.4.1
		2. Identify a format	E5.4.2
		3. Write sales contract	E5.4.3
		4. Explain importance of professional assistance	E5.4.4
		5. Define terminology	E5.4.5
	E.	Describe the work of the Evironmental Protection Agency	P5.5
		1. Identify location of appropriate reference material	E5.5.1
		2. Determine information to be included in written report	E5.5.2
		3. Prepare draft of written report	E5.5.3
		4. Demonstrate ability to use correct grammar, vocabulary, and spelling	E5.5.4
VII.	Protecting the Environment		
	A.	Make recommendations on good sanitation practices	P6.13
		1. Define terminology	E6.13.1
		2. Identify location of appropriate reference material	E6.13.2
		3. Identify situations where sanitation principles are applicable	E6.13.3

    4. Determine most effective practice for a situation E6.13.4
    5. List recommendations for situations E6.13.5

- B. Describe agencies responsible for protecting the environment P6.14
    1. Identify location of appropriate reference material E6.14.1
    2. Determine information to be included in report E6.14.2
    3. Prepare draft of written report E6.14.3
    4. Demonstrate ability to use correct grammar, vocabulary, and spelling E6.14.4

- C. Interpret various programs of the soil conservation agencies P6.16
    1. Explain the purpose of each agency E6.16.1
    2. Determine the funding source E6.16.2
    3. Identify major programs E6.16.3
    4. Relate programs to a farm or business E6.16.4

- D. Analyze a sample of water P6.17
    1. Collect samples of water E6.17.1
    2. Outline procedures to follow E6.17.2
    3. List bacteria count E6.17.3
    4. Determine content of sample E6.17.4
    5. Record information E6.17.5

- E. Estimate the water needs P6.18
    1. Identify various uses for water E6.18.1
    2 Determine human consumption needs E6.18.2
    3. Determine livestock consumption needs E6.18.3
    4. Determine lawn, garden, and crop consumption needs E6.18.4
    5. Identify needs for a natural resource enterprise E6.18.5
    6. Compute total gallons needed for a time period E6.18.6
    7. Apply mathematical skills E6.18.7

VIII. Planning and Managing Land Usage

- A. Identify alternative land treatment plans P7.9
    1. Identify soil types E7.9.1
    2. Locate soil type E7.9.2
    3. Explain restrictions E7.9.3
    4. List recommendations E7.9.4

	B.		Develop farm land-use plans	P7.10
		1.	Determine personal and production goals	E7.10.1
		2.	Collect information on usage	E7.10.2
		3.	Examine site	E7.10.3
		4.	Determine agricultural practices	E7.10.4
		5.	Define terminology	E7.10.5
	C.		Interpret land-use maps	P7.11
		1.	Define terminology	E7.11.1
		2.	Explain symbols	E7.11.2
		3.	Determine possible uses	E7.11.3
		4.	Justify uses of land	E7.11.4
IX.	Managing Fish and Wildlife			
	A.		Propagate fish	P8.8
		1.	Collect sperm, fertilize eggs	E8.8.1
		2.	Calculate time and frequency of fertilization	E8.8.2
		3.	Identify diseased and unfertilized eggs	E8.8.3
		4.	Determine proper amount of food for fry	E8.8.4
		5.	Check water quality	E8.8.5
	B.		Keep records of fish	P8.9
		1.	Keep records of fish	E8.9.1
		2.	Inventory species of fish	E8.9.2
		3.	Determine average yearly growth, record data	E8.9.3
		4.	Apply mathematical skills	E8.9.4
		5.	Keep work diaries and logs	E8.9.5
		6.	Prepare illustrations, tables, and graphs for data	E8.9.6
	C.		Determine proper stocking rate in ponds	P8.10
		1.	Calculate surface and running water	E8.10.1
		2.	Explain method of collecting fish for size determination	E8.10.2
		3.	Identify procedures to remove undesirable fish	E8.10.3
		4.	Provide for removal of harvestable fish	E8.10.4
		5.	Apply mathematical skills	E8.10.5

D.	Identify elements for maintenance of a marsh for wildlife habitat	P8.11
1.	Define terminology	E8.11.1
2.	Describe existing plant material/wildlife	E8.11.2
3.	Determine type of marsh/salt content	E8.11.3
4.	Identify procedures to secure plant materials	E8.11.4
5.	Explain methods used to prepare area for seeding/planting	E8.11.5
E.	Raise game birds	P8.12
1.	Select breeding stock	E8.12.1
2.	Secure and prepare needed equipment	E8.12.2
3.	Incubate, hatch eggs; brood chicks	E8.12.3
4	Raise birds	E8.12.4
5.	Trim bills, clip wings	E8.12.5
6.	Identify and treat diseases	E8.12.6
7.	Explain methods of controlling predatory animals	E8.12.7
8.	Prepare for and conduct sale of birds	E8.12.8
9.	Keep necessary records	E8.12.9
10.	Define terminology	E8.12.10
11.	Apply mathematical skills	E8.12.11
F.	Explain propagation of game animals	P8.13
1.	Select breeding stock	E8.13.1
2.	Select breeds locally adaptable	E8.13.2
3.	Identify signs of estrus	E8.13.3
4.	Describe mating procedures	E8.13.4
5.	Explain safety precautions for propagation	E8.13.5
X.	Managing the Forest	
A.	Identify regeneration techniques necessary for continuous growth	P9.7
1.	List techniques	E9.7.1
2.	Identify appropriate usage	E9.7.2
3.	Describe procedures	E9.7.3
4.	Define terminology	E9.7.4

B.	Design plans to establish forest roads	P9.8
1.	Determine need for road	E9.8.1
2.	Determine general location of road	E9.8.2
3.	Identify actual and visual impact on environment and road structure	E9.8.3
4.	Describe a possible road layout	E9.8.4
5.	Conduct preliminary survey, mark road	E9.8.5
6.	Explain method used to clear merchantable trees	E9.8.6
7.	Explain importance of providing drainage and slope stabilization	E9.8.7
8.	Describe how to maintain roads	E9.8.8
9.	Identify procedure to prepare needed skid roads	E9.8.9
10.	Locate landings to accommodate equipment	E9.8.10
11.	Explain methods to control erosion	E9.8.11
12.	Define terminology	E9.8.12
13.	Apply mathematical skills	E9.8.13
C.	Develop a forest management plan	P9.9
1.	Identify a major forest type in region	E9.9.1
2.	Determine objectives of forest owner	E9.9.2
3.	Analyze current forest stand	E9.9.3
4.	Explain the need for intermediate and harvest cuts	E9.9.4
5.	Identify practices to assure optimal growth	E9.9.5
6.	Determine how to secure cost-efficient machinery, equipment, and tools	E9.9.6
7.	Explain procedure to prepare land for reforrestation	E9.9.7
8.	Define terminology	E9.9.8
9.	Apply mathematical skills	E9.9.9
D.	Plan a timber stand improvement project	P9.10
1.	Define timber stand improvement (TSI) and related terminology	E9.10.1
2.	Explain method used to prepare forest site for planting	E9.10.2
3.	Identify procedures used to seed site	E9.10.3
4.	Identify procedures used to thin and prune site	E9.10.4
5.	Describe various terms of TSI	E9.10.5
6.	Apply mathematical skills	E9.10.6

E. Manage a forest harvesting plot P9.11

1. Select trees for harvest E9.11.1
2. Demonstrate ability to use roads to good advantage E9.11.2
3. Supervise felling of trees E9.11.3
4. Supervise limbing and bucking of trees E9.11.4
5. Supervise handling and skidding of trees E9.11.5
6. Supervise loading of logs E9.11.6
7. Supervise hauling of logs E9.11.7
8. Enforce safety regulations E9.11.8
9. Define terminology E9.11.9
10. Apply mathematical skills E9.11.10
11. Maintain necessary records E9.11.11

XI. Controlling and Preventing Forest Fires

A. Describe fire location, using appropriate terminology P10.2

1. Describe features, symbols on a contour map E10.2.1
2. Explain forest fire location system E10.2.2
3. Define measurement units E10.2.3
4. Determine how to read and follow a compass E10.2.4
5. Identify north, east, west, and south E10.2.5
6. Define terminology E10.2.6
7. Apply mathematical skills E10.2.7

B. Write a control program for a fire P10.3

1. Describe main parts of a fire environment and interaction E10.3.1
2. List and describe characteristics of fire behavior E10.3.2
3. Describe fire management decisions, relate to fire control plan E10.3.3
4. List methods of fire control E10.3.4
5. Explain calculations used to determine fire's potential behavior E10.3.5
6. Define terminology E10.3.6
7. Apply mathematical skills E10.3.7

C. Conduct safety training exercises and demonstrate being responsible for others in fire control P10.4

1. Recite and explain the 10 Standard Fire Fighting Orders E10.4.1

		2.	Describe necessary precautions	E10.4.2
		3.	Identify fire characteristics leading to fatality	E10.4.3
		4.	Explain importance of effective communication	E10.4.4
		5.	Demonstrate ability to use fire-fighting tools and equipment properly	E10.4.5
		6.	Outline series of safety lessons	E10.4.6
		7.	Define terminology	E10.4.7
	D.		Prepare publicity on fire prevention	P10.5
		1.	Describe forest fire and burning laws	E10.5.1
		2.	Illustrate fire prevention methods	E10.5.2
		3.	Describe Forest Service symbols used in publicity	E10.5.3
		4.	Select appropriate format for publicity release	E10.5.4
		5.	Explain restrictions in using "Smokey the Bear"	E10.5.5
XII.			Harvesting Forest Products	
	A.		Select timber for purchase	P11.3
		1.	Locate forest inventory information for locality	E11.3.1
		2.	Explain procedure to follow in examining timber stands	E11.3.2
		3.	Determine fair market value for owners of tracts	E11.3.3
		4.	Identify special problems for each tract	E11.3.4
		5.	Define terminology	E11.3.5
		6.	Apply mathematical skills	E11.3.6
	B.		Plan logging activities	P11.4
		1.	Explain procedure to follow in examining timber site to determine size and location of harvesting tract	E11.4.1
		2.	Develop time schedule for harvesting	E11.4.2
		3.	Outline logging activities	E11.4.3
		4.	Project required cash flows	E11.4.4
		5.	Devise alternative schedules to determine impact upon performance or profit	E11.4.5
		6.	Define terminology	E11.4.6
		7.	Apply mathematical skills	E11.4.7

C.	Analyze the purchase of equipment	P11.5
1.	Determine job demands for specific equipment	E11.5.1
2.	Compute ownership and operations costs	E11.5.2
3.	Identify advantages/disadvantages of purchase	E11.5.3
4.	Examine purchase impact on cash flow	E11.5.4
5.	Explain how to locate equipment dealers	E11.5.5
6.	Determine parts availability	E11.5.6
7.	Determine best financing option	E11.5.7
8.	Explain process of ordering equipment	E11.5.8
9.	Determine arrangements for payment	E11.5.9
10.	Apply mathematical skills	E11.5.10
D.	Outline the procedure for supervising the loading of logs	P11.6
1.	Explain importance of having a clear work area	E11.6.1
2.	List process used to inspect loading equipment prior to loading	E11.6.2
3.	Identify procedure to follow for loading	E11.6.3
4.	Explain procedure used to determine if load is balanced	E11.6.4
5.	Describe how to attach chains and load binders correctly	E11.6.5
6.	Determine legal load limits and route to be followed	E11.6.6
7.	Describe process of estimating weight of vehicle	E11.6.7
8.	Explain OSHA standards	E11.6.8
E.	Outline the procedure for supervising the unloading of logs	P11.7
1.	Explain necessity of posting signs	E11.7.1
2.	Describe process used to release, remove, and store load binders	E11.7.2
3.	List uses of loader to stabilize load before tripping stakes	E11.7.3

	4. Identify reasons for tripping stakes	E11.7.4
	5. Explain how to unload vehicle	E11.7.5
	6. Explain use of hand signals	E11.7.6
	7. Explain how to reset stakes, move truck, clear debris	E11.7.7
	8. Identify current OSHA standards	E11.7.8
F.	Develop a plan to deliver forest products to manufacturing sites	P11.8
	1. Determine delivery route and a delivery schedule	E11.8.1
	2. Identify how to examine load to determine compliance with regulations	E11.8.2
	3. Explain how to reexamine load and vehicle	E11.8.3
	4. Identify how to operate vehicle safely, efficiently	E11.8.4
	5. Explain scaling process	E11.8.5
	6. Identify process followed after unloading, prepare vehicle for return trip	E11.8.6
G.	Demonstrate ability to fell trees, using chain saw	P11.9
	1. Determine where tree should be dropped	E11.9.1
	2. Examine site carefully	E11.9.2
	3. Describe the location of skid trails and an escape route	E11.9.3
	4. Determine direction for tree to be felled from or toward the skid trail	E11.9.4
	5. Demonstrate ability to make undercut	E11.9.5
	6. Demonstrate ability to make backcut	E11.9.6
	7. Use wedges as needed	E11.9.7
	8. Use techniques necessary for leaning, rotten, or lodged trees	E11.9.8
	9. Follow OSHA standards	E11.9.9
	10. Define terminology	E11.9.10
H.	Demonstrate ability to limb and top felled trees	P11.10
	1. Remove limbs	E11.10.1
	2. Cut away from self on opposite side of stem	E11.10.2
	3. Make cut flush with stem	E11.10.3
	4. Top tree	E11.10.4

		5.	Describe mechanical devices used for limbing softwoods	E11.10.5
		6.	Follow state laws or landowner's directions for limb disposal	E11.10.6
		7.	Follow safe procedure for removing limbs under stress	E11.10.7
		8.	Define terminology	E11.10.8
	I.		Make bucking cuts	P11.11
		1.	Explain relationship of bucking procedure to products to be delivered, their value, and purchaser specification	E11.11.1
		2.	Size tree stem and mark suitable bucking cuts	E11.11.2
		3.	Demonstrate ability to use procedures to obtain maximum volume	E11.11.3
		4.	Make bucking cuts in safe manner	E11.11.4
		5.	Follow OSHA standards	E11.11.5
		6.	Define terminology	E11.11.6
		7.	Apply mathematical skills	E11.11.7
XIII.			Managing Recreational Enterprises	
	A.		Inspect recreational areas	P13.3
		1.	Determine proper condition	E13.3.1
		2.	Describe orally whether tree meets standards	E13.3.2
		3.	Identify action to be taken in cases of noncompliance	E13.3.3
		4.	Arrange for work necessary to return area to proper condition	E13.3.4
	B.		Describe procedures involved in hunting/fishing expedition	P13.4
		1.	Organize hunting/fishing parties	E13.4.1
		2.	Select geographical location	E13.4.2
		3.	Estimate needs and secure supplies	E13.4.3
		4.	Map and plan routes	E13.4.4
		5.	Obtain required licenses	E13.4.5
		6.	Plan daily schedules	E13.4.6
		7.	Plan arrangements	E13.4.7
		8.	Determine per person charges	E13.4.8

C.	Direct and lead activities	P13.5
1.	Analyze abilities and needs of individuals	E13.5.1
2.	Select appropriate activities	E13.5.2
3.	Secure supplies and materials	E13.5.3
4.	Provide directions and motivation	E13.5.4
5.	Evaluate the success	E13.5.5
D.	Advise on navigational methods	P13.6
1.	Describe boat registration procedures	E13.6.1
2.	List safety equipment	E13.6.2
3.	Describe rules of the road	E13.6.3
4.	Identify unlawful acts	E13.6.4
5.	Describe waterway markers	E13.6.5
6.	Define terminology	E13.6.6
E.	Develop rules for campgrounds	P13.7
1.	Identify situations requiring written rules	E13.7.1
2.	Determine rules used	E13.7.2
3.	Explain the need for a rule	E13.7.3
4.	Compose rules	E13.7.4
F.	Order weekly campground supplies	P13.8
1.	Order parts for campground equipment	E13.8.1
2.	Determine appropriate order for food supplies	E13.8.2
3.	Order medical supplies	E13.8.3
4.	Identify consumable supplies	E13.8.4
5.	Apply mathematical skills	E13.8.5
G.	Locate trails	P13.9
1.	Examine site to discover scenery and grades involved	E13.9.1
2.	Determine characteristics of self-guiding trail	E13.9.2
3.	Mark and clear trails	E13.9.3
4.	Provide adequate bridging	E13.9.4
5.	Develop rest areas	E13.9.5
6.	Establish and maintain safety hazard warning signs	E13.9.6
7.	Plan for adequate training	E13.9.7
8.	Determine liability risks	E13.9.8
9.	Apply mathematical skills	E13.9.9

	H.	Plan sled and snowmobile areas	P13.10
	1.	Identify possible sites	E13.10.1
	2.	Examine method to clear and mark trails and paths	E13.10.2
	3.	Provide rest stations	E13.10.3
	4.	Develop equipment rental plan	E13.10.4
	5.	Describe a plan for equipment maintenance and repair	E13.10.5
	6.	Identify a plan to provide for safety and patrolling	E13.10.6
	7.	Apply mathematical skills	E13.10.7
	I.	Select method to control insects in camping areas	P13.11
	1.	Identify major insect infestations	E13.11.1
	2.	Determine methods of control	E13.11.2
	3.	List advantages/disadvantages of methods	E13.11.3
	4.	Prepare pesticides	E13.11.4
	5.	Determine effectiveness	E13.11.5
	6.	Apply mathematical skills	E13.11.6
XIV.		Surveying Land	
	A.	Set up and operate surveying instruments	P14.4
	1.	List/describe parts of the level	E14.4.1
	2.	Demonstrate ability to set up tripod	E14.4.2
	3.	Remove level from case	E14.4.3
	4.	Remove dust cap	E14.4.4
	5.	Adjust instrument to level	E14.4.5
	6.	Focus level crosshairs	E14.4.6
	7.	Demonstrate ability to view rod	E14.4.7
	8.	Define terminology	E14.4.8
	9.	Apply mathematical skills	E14.4.9
	B.	Adjust and clean surveying instruments	P14.5
	1.	Identify adjustments made to instruments	E14.5.1
	2.	Determine materials used	E14.5.2
	3.	Outline procedure for cleaning instruments	E14.5.3

C. Identify and correct malfunctions of surveying equipment	P14.6
1. List possible malfunctions	E14.6.1
2. Identify common malfunctions	E14.6.2
3. Determine procedures for correcting	E14.6.3
4. Determine situations requiring assistance	E14.6.4
D. Locate and stake a terrace line	P14.7
1. Explain plan	E14.7.1
2. Assemble materials needed	E14.7.2
3. Stake terrace line	E14.7.3
4. Compare staked line	E14.7.4
E. Determine field area	P14.8
1. Identify boundaries	E14.8.1
2. Determine shapes and distances	E14.8.2
3. Secure formulas for calculations	E14.8.3
4. Define terminology	E14.8.4
5. Apply mathematical skills	E14.8.5
XV. Constructing and Maintaining Facilities	
A. Demonstrate ability to build a masonry retaining wall	P15.6
1. Lay out footing	E15.6.1
2. Dig footer trench	E15.6.2
3. Set stakes to show concrete depth	E15.6.3
4. Pour concrete	E15.6.4
5. Assemble tools, equipment, and supplies	E15.6.5
6. Mix mortar	E15.6.6
7. Apply mortar to blocks	E15.6.7
8. Set block in place	E15.6.8
9. Smooth mortar joints	E15.6.9
10. Clean and store tools, equipment, and supplies	E15.6.10
11. Clean wall	E15.6.11
12. Define terminology	E15.6.12
13. Apply mathematical skills	E15.6.13

B.	Build a stone wall	P15.7
1.	Lay out footing	E15.7.1
2.	Dig footer trench	E15.7.2
3.	Set stakes	E15.7.3
4.	Pour concrete	E15.7.4
5.	Assemble tools, equipment, and supplies	E15.7.5
6.	Mix mortar	E15.7.6
7.	Apply mortar to stones and joints	E15.7.7
8.	Set stones	E15.7.8
9.	Smooth mortar joints	E15.7.9
10.	Clean and store tools, equipment, and supplies	E15.7.10
11.	Clean stones	E15.7.11
12.	Define terminology	E15.7.12
13.	Apply mathematical skills	E15.7.13
C.	Demonstrate knowledge and ability in performing subjourney-level skills in carpentry	P15.8
1.	Identify simple hand and power tools	E15.8.1
2.	Describe function of tools	E15.8.2
3.	Demonstrate ability to perform basic skills	E15.8.3
4.	Demonstrate knowledge of performing more advanced skills	E15.8.4
D.	Demonstrate knowledge and ability in performing subjourney-level skills in electricity	P15.9
1.	Identify hand and power tools	E15.9.1
2.	Describe function of tools	E15.9.2
3.	Demonstrate ability to perform basic skills	E15.9.3
4.	Demonstrate knowledge of performing more advanced skills	E15.9.4
E.	Demonstrate knowledge and ability in performing subjourney-level skills in plumbing	P15.10
1.	Identify hand and power tools	E15.10.1
2.	Describe function of tools	E15.10.2
3.	Demonstrate ability to perform basic skills	E15.10.3
4.	Demonstrate knowledge of performing more advanced skills	E15.10.4

XVI.	Operating Vehicles and Equipment		
		Demonstrate ability to operate vehicles and equipment	P16.3
	1.	Explain general safety rules	E16.3.1
	2.	Demonstrate knowledge of operator's manual	E16.3.2
	3.	Describe starting procedures and operating controls	E16.3.3
	4.	Determine proper and improper functioning	E16.3.4
	5.	Perform necessary adjustments under field conditions	E16.3.5
	6.	Determine capabilities of vehicles and equipment	E16.3.6
	7.	Identify specific safety rules	E16.3.7
	8.	Define terminology	E16.3.8
XVII.	Maintaining Vehicles and Equipment		
	A.	Demonstrate ability to maintain vehicles and equipment	P17.3
	1.	Explain general safety rules	E17.3.1
	2.	Demonstrate knowledge of operator's manual	E17.3.2
	3.	Describe starting procedures and operating controls	E17.3.3
	4.	Determine proper and improper functioning	E17.3.4
	5.	Perform necessary adjustments under field conditions	E17.3.5
	6.	Determine capabilities of vehicles and equipment	E17.3.6
	7.	Identify specific safety rules	E17.3.7
	8.	Define terminology	E17.3.8
	B.	Service various types of equipment drives	P17.4
	1.	Identify basic types of belts, chains, gears, and their application in equipment drives	E17.4.1
	2.	Inspect components of equipment drives	E17.4.2
	3.	Clean components of equipment drives	E17.4.3
	4.	Lubricate equipment drives	E17.4.4
	5.	Adjust belts, chains, gears, sprockets	E17.4.5
	6.	Examine equipment to determine if safety shields are in place	E17.4.6
	7.	Define terminology	E17.4.7
	8.	Apply mathematical skills	E17.4.8

C. Attach accessory equipment P17.5

1. Determine hook-up sequence by reading operator's manual E17.5.1
2. Describe general and specific safety precautions E17.5.2
3. Perform necessary physical operations E17.5.3
4. Determine if equipment is properly attached E17.5.4
5. Determine whether accessory equipment remains properly attached E17.5.5
6. Define terminology E17.5.6

XVIII. Groundskeeping

Develop fertilization schedules P18.17

1. Examine description of landscape area E18.17.1
2. Examine results of soil testing E18.17.2
3. List each type of shrub, flower, tree, and lawn area E18.17.3
4. Identify publications E18.17.4
5. List fertilizer types, application rates, application methods E18.17.5
6. Determine approximate dates for application E18.17.6
7. Keep records E18.17.7
8. Apply mathematical skills E18.17.8

XIX. Securing Natural Areas

Demonstrate ability to patrol assigned area P20.1

1. Determine schedule for patrolling E20.1.1
2. Explain to visitors rules and regulations E20.1.2
3. Identify ways to enforce rules and regulations E20.1.3
4. Outline types of duties E20.1.4
5. Idenitfy situations requiring action or assistance E20.1.5

XX. Applying General Knowledge of Natural Resources

A. Identify and list natural resources of a site P21.3

1. Compile a checklist of natural resources E21.3.1

2. Identify each of the natural resources in a natural state	E21.3.2
3. Identify each natural resource found on site	E21.3.3
4. Demonstrate ability to classify resources	E21.3.4
B. Identify, by common and scientific name, common Virginia grasses and plants	P21.4
1. Compile a list of common Virginia grasses and plants	E21.4.1
2. Secure drawings of grasses and plants	E21.4.2
3. Secure and preserve samples	E21.4.3
4. Identify each plant and grass by common and scientific name	E21.4.4

POSTSECONDARY PROGRAMS AND COURSES

PROGRAM TITLE: Agricultural and Natural Resources Technology

DESCRIPTION: This program is one of six within the Virginia Community College System that lead to an Associate in Applied Science Degree, a degree covering all programs in Occupational-Technical Education.

Each degree program includes several majors, some of which are further divided into appropriate specializations. This breakdown is shown for the Agricultural and Natural Resources Technology degree program.

Degree
    Majors
        Specialization

Agricultural and Natural Resources Technology
- Agricultural Business
- Agronomy
- Animal Science
    - Animal Husbandry
    - Animal Technology

- Forestry

    - Forest Products Producer

- Horticulture
- Livestock
- Natural Resources Management and Security
- Wildlife

Many of the specialized courses, including Agricultural Business, Agricultural Production, and Horticulture, offered within the community college system are suitable for persons in Natural Resources Management. A complete listing of these courses appears in the Virginia Community College System State Curriculum Guide. Included here is the listing for the Forestry and Recreation and Parks options.

A suggested task/competency listing for postsecondary courses is contained on the following pages along with the content outline. A particular postsecondary course may contain some elements of this outline, however, a person would have to choose many courses in order to complete the suggested outline.

FORESTRY

VCCS COURSE NUMBER	VCCS COURSE TITLE
FORE 100	Introduction to Forestry
106	Forest and Wildlife Ecology
107	Range Management
110	Introduction to Forest and Wildlife Mgt.
117	Dendrology
118	Applied Silviculture
121	Forest Fire Control
122	Forest Protection
130	Forest and Wildlife Recreation Mgt.
131	Wildlife and Fisheries Mgt.
132	Forest Recreation
141	Wildlife Management Practices I
142	Wildlife Management Practices II
143	Wildlife Management Practices III
150	Introduction to Urban Forestry
187	Forest Practicum
201	Forest Mensuration I
202	Forest Mensuration II
203	Tree, Log and Lumber Grading
204	Wildlife Investigational Techniques I
205	Wildlife Investigational Techniques II
206	Wildlife Management Techniques
207	Aerial Photo Interpretation
215	Habitat Management
216	Managing the Backyard Wildlife Habitat
217	Plant Identification
220	Wildlife Ecology
227	Game Fish Ecology
230	Forest Management
231	Woodlot Management
240	Habitat and Food Plant Identification
241	Forest Products I
247	Timber Harvesting
250	Heavy Equipment Operation and Maintenance
252	Cost Control in the Logging Industry
256	Basic Sawmilling
258	Contracts and Cost for Logging

RECREATION AND PARKS

VCCS COURSE NUMBER	VCCS COURSE TITLE
RCPK 100	Introduction to the Recreation and Parks Field
101	Recreation and Parks Mgt. I
102	Recreation and Parks Mgt. II
103	Recreation and Parks Mgt. III
106	Team Sports in Recreation
107	Individual Sports in Recreation
108	Recreation for Special Groups
109	Playground Leadership
110	Recreational Applied Arts Mgt.
111	Recreation Intramurals I
112	Recreation Intramurals II
113	Recreation Intramurals III
116	Social Recreation Leadership
117	Social Recreation
118	Recreational Arts and Crafts
120	History and Introduction to Recreation
126	Natural Resources and the Urban Enrvironment
127	Park Planning
136	Program Planning, Organization and Group Leadership
137	Organization and Management of Recreational Sports Activities
138	Fundamentals of Camp Management and Operation
139	Marine Recreation
146	Community and Family Recreation
150	Survey of Private, Commercial, and Industrial Recreation
160	The Arts in Recreation
206	Outdoor Recreation
207	Recreational Drama
208	Recreational Dance
220	Fundamentals of Interpretive Services
224	Natural and Historical Interpretation in the Urban Environment I
225	Natural and Historical Interpretaton in the Urban Environment II

TASK/COMPETENCY LISTING

3.15 Prepare a complete income and expense budget for a natural resources business or agency
3.16 Interpret a financial statement
3.17 Apply the principles of double-entry bookkeeping
3.18 Determine personnel requirements
3.19 Interview and select employees
3.20 Demonstrate training techniques
3.21 Supervise subordinate workers
3.22 Evaluate employee's performance
3.23 Develop work methods and procedures
3.24 Lay out a weekly schedule of activities for an employee
3.25 Explain working conditions under existing contract agreements
4.6 Demonstrate knowledge of broadcast promotions
4.7 Assist in conducting tours
4.8 Address audience interested in natural resources
5.6 Express a knowledge of federal, state, and local news; rules; and regulations related to environmental protection
5.7 Interpret appropriate federal, state, and local labor laws
5.8 Interpret Occupational Safety and Health Act implications on natural resource enterprises
5.9 Identify laws which regulate public access
5.10 Outline procedure for obtaining a lease with landowner for land open to public activities
6.15 Describe methods of dealing with conservation problems, planning, and practices
6.19 Collect necessary samples for EPA inspections
6.20 Participate in investigative activities by collecting field data for agencies
6.21 Operate and maintain the Dissolved Oxygen Meter and Sampler
6.22 Monitor potential pollutors
6.23 Demonstrate ability to advise public on pollution problems
6.24 Diagram a sewage disposal system
7.12 Formulate the agricultural land use section of a comprehensive plan for community development
8.14 Operate a game animal-checking station during hunting seasons
8.15 Measure wildlife population
8.16 Demonstrate ability to manage wildlife
8.17 Report on the control of diseases and parasites
8.18 Describe the establishment of a wildlife preserves area
8.19 Develop recommendations to conduct a wildlife control program
8.20 Supervise operation of equipment and facilities for plant life projects
10.6 Lay out a plan on paper to mop up the fire after it is brought under control
10.7 Complete the Forest Service fire report
11.12 Outline procedures for managing harvesting operations
12.1 Demonstrate sawmill safety, including first-aid treatment

12.2 Demonstrate ability to perform general operation activities
12.3 Demonstrate ability to operate carriage
12.4 Grade a stack of lumber
12.5 Demonstrate ability to operate circular saw
13.12 Design recreational enterprise
13.13 Identify and plan the financial backing needed for a recreation facility
13.14 Assist in the formulation and development of interpretive program services
13.15 Plan security programs for recreational enterprises
13.16 Design special features including a skeet range, rifle and pistol area, and archery range
14.9 Measure and record distances, run compass lines, and identify topographic features
14.10 Complete a surveying job
14.11 Demonstrate ability to use hand level or engineering level and tape
14.12 Write legal descriptions of a selected plot of land
14.13 Convert English measurement units to metric equivalents, and metric equivalents to units
14.14 Perform land line location and corner restoration work
15.11 Maintain and operate water treatment plants, wells, swimming pools, and chlorine systems
16.4 Demonstrate ability to operate vehicles and equipment applicable to the postsecondary natural resources management program
17.6 Demonstrate ability to maintain vehicles and equipment applicable to the postsecondary natural resources management program
19.7 Explain method of investigating accidents or incidents
20.2 Demonstrate ability to apprehend violators and take appropriate action
20.3 Explain procedure for preparing cases for prosecution
20.4 Interpret fish and game laws, rules, and regulations

CONTENT OUTLINE

I.	Managing a Natural Resources Business		
	A.	Prepare a complete budget	P3.15
	1.	Identify items of income and expense	E3.15.1
	2.	Explain purpose and uses of a budget	E3.15.2
	3.	List procedures for budget preparation	E3.15.3
	4.	Prepare a budget format	E3.15.4
	5.	Define terminology	E3.15.5
	6.	Apply mathematical skills	E3.15.6
	B.	Interpret a financial statement	P3.16
	1.	Describe a financial statement	E3.16.1
	2.	Identify the purpose of a financial statement	E3.16.2
	3.	Explain the various components to statement	E3.16.3
	4.	Define terminology	E3.16.4
	5.	Explain the relationship of record-keeping and accounting to a statement	E3.16.5
	6.	Apply mathematical skills	E3.16.6
	C.	Apply the principles of double-entry bookkeeping	P3.17
	1.	Demonstrate ability to add, subtract, multiply, divide whole numbers with decimals	E3.17.1
	2.	Define terminology	E3.17.2
	3.	Explain principles of double entry bookkeeping	E3.17.3
	4.	Write figures neatly, legibly	E3.17.4
	D.	Determine personnel requirements	P3.18
	1.	Identify mission statement and determine its impact upon hiring practices	E3.18.1
	2.	Identify need for specialized personnel	E3.18.2
	3.	List duties of persons to be employed	E3.18.3
	4.	Develop personnel plan	E3.18.4
	5.	Write appropriate job descriptions	E3.18.5
	E.	Interview and select employees	P3.19
	1.	Determine the amount of labor needed	E3.19.1
	2.	Assess degree of competency required	E3.19.2
	3.	Review applications	E3.19.3
	4.	Interview prospective employees	E3.19.4
	5.	Complete paperwork to hire employee	E3.19.5
	6.	Demonstrate ability to inform other applicants of decision	E3.19.6

F.	Demonstrate training techniques	P3.20
1.	Determine worker's background and experience	E3.20.1
2.	Select task for which skill is lacking	E3.20.2
3.	Demonstrate task	E3.20.3
4.	Evaluate worker's performance	E3.20.4
5.	Determine if re-training is necessary	E3.20.5
6.	Repeat procedure for remainder of tasks	E3.20.6
G.	Supervise subordinate workers	P3.21
1.	Explain the importance of developing positive work attitudes	E3.21.1
2.	Identify components of positive interpersonal skills	E3.21.2
3.	Describe responsibility of supervisor to employee	E3.21.3
4.	List expectations of supervisor for employee	E3.21.4
H.	Evaluate employee's performance	P3.22
1.	Describe role of supervisor in employee performance evaluation	E3.22.1
2.	Analyze employee's performance according to evaluation form	E3.22.2
3.	Complete the evaluation form accurately	E3.22.3
I.	Develop work methods and procedures	P3.23
1.	Identify task to be performed	E3.23.1
2.	List methods to be followed in completing the task	E3.23.2
3.	Explain methods	E3.23.3
4.	Identify the importance of revising methods as necessary	E3.23.4
J.	Lay out a weekly schedule of activities for an employee	P3.24
1.	Identify component parts/tasks of a job	E3.24.1
2.	Organize tasks	E3.24.2
3.	Estimate time required	E3.24.3
4.	Identify amount of time for completion of task	E3.24.4
5.	Complete written form listing employee activities	E3.24.5
K.	Explain working conditions under existing contract agreements	P3.25
1.	Describe provisions of employee's contract	E3.25.1
2.	Identify working conditions covered by contract	E3.25.2
3.	Determine whether working conditions are compatible with contract	E3.25.3

4.	Explain procedure if working conditions and contracts not in compliance	E3.25.4
5.	Explain need for flexibility within contract	E3.25.5

II. Advertising and Promoting the Natural Resources Enterprise

A.	Demonstrate knowledge of broadcast promotions	P4.6
1.	Select a radio or television station with appropriate audience	E4.6.1
2.	Plan needed radio or television program	E4.6.2
3.	Determine best times of broadcast	E4.6.3
4.	Determine necessary materials for broadcast	E4.6.4
5.	Explain how to use time effectively	E4.6.5
6.	Demonstrate ability to use correct grammar, spelling, and vocabulary	E4.6.6
7.	Define terminology	E4.6.7
B.	Assist in conducting tours	P4.7
1.	Describe functions of a tour guide	E4.7.1
2.	Identify the criteria listed in 4.7 and the importance of each	E4.7.2
3.	Explain importance of speaking ability and vocabulary	E4.7.3
C.	Address audience interested in natural resources	P4.8
1.	Select suitable topic	E4.8.1
2.	Analyze audience	E4.8.2
3.	Determine presentation content	E4.8.3
4.	Prepare outline of presentation	E4.8.4
5	Practice presentation	E4.8.5
6.	Present speech	E4.8.6
7.	Use appropriate grammar and vocabulary	E4.8.7

III. Applying Legal Aspects

A.	Demonstrate a knowledge of laws related to environmental protection	P5.6
1.	Identify major legislative acts related to environmental protection	E5.6.1
2.	Describe the intent of each act	E5.6.2
3.	List punitive action that may be taken against violators	E5.6.3
4.	Define terminology	E5.6.4

B. Interpret appropriate laws P5.7

   1. Identify location of appropriate reference materials E5.7.1
   2. Explain applicability of law E5.7.2
   3. Describe various laws E5.7.3
   4. Define terminology E5.7.4

C. Interpret OSHA implications P5.8

   1. Secure a current copy of OSHA regulations E5.8.1
   2. Determine regulations applying to a natural resources enterprise E5.8.2
   3. Identify acceptable and unacceptable situations E5.8.3
   4. Make a list of recommendations to upgrade unacceptable situations E5.8.4
   5. Define terminology E5.8.5

D. Identify laws regulating public access P5.9

   1. Identify location of appropriate reference materials E5.9.1
   2. Describe the intent of each law E5.9.2
   3. Define terminology E5.9.3

E. Outline procedure for obtaining leases with landowners for land open to public activities P5.10

   1. Identify reasons why landowner would allow public access E5.10.1
   2. Distribute game commission signs and posters E5.10.2
   3. Explain procedures to advise landowners on planting and maintaining game habitats E5.10.3
   4. Obtain copies of a suitable lease E5.10.4
   5. Secure leases with individual landowners E5.10.5
   6. Define terminology E5.10.6

IV. Protecting the Environment

A. Describe methods of dealing with conservation problems, planning, and practices P6.15

   1. Identify conservation problems E6.15.1
   2. Describe problem E6.15.2
   3. Determine plan(s) to correct problem E6.15.3
   4. Explain necessary conservation practices to deal with problem E6.15.4
   5. Estimate costs involved E6.15.5
   6. Define terminology E6.15.6

B. Collect necessary samples for EPA inspections P6.19

   1. Locate references related to sample collection E6.19.1
   2. Identify equipment needed E6.19.2
   3. Outline procedures to be followed E6.19.3
   4. Prepare written documents E6.19.4

C.	Participate in investgative activities	P6.20
1.	Determine agency policies	E6.20.1
2.	Explain legal requirements to be followed	E6.20.2
3.	Identify data to be collected and an appropriate recording form	E6.20.3
4.	Describe potentially hazardous situations	E6.20.4
D.	Operate and maintain the Dissolved Oxygen Meter and Sampler	P6.21
1.	Secure owner's manual for equipment	E6.21.1
2.	Outline operating procedures	E6.21.2
3.	Explain maintenance procedures	E6.21.3
4.	Identify malfunctions in equipment	E6.21.4
5.	Define terminology	E6.21.5
E.	Monitor potential pollutors	P6.22
1.	Describe agency's policies about monitoring	E6.22.1
2.	Explain harassment as applied to monitoring	E6.22.2
3.	Plan schedule for systematic observation of potential pollutors	E6.22.3
4.	Maintain accurate records	E6.22.4
5.	Explain monitoring results to supervisors	E6.22.5
F.	Demonstrate ability to advise public on pollution problems	P6.23
1.	Research current information on a particular problem	E6.23.1
2.	Demonstrate ability to prepare article	E6.23.2
3.	Demonstrate ability to use correct grammar, vocabulary, and spelling	E6.23.3
G.	Diagram a sewage disposal system	P6.24
1.	Define terminology	E6.24.1
2.	Examine local, state, and federal regulations	E6.24.2
3.	List symbols used to describe components	E6.24.3
4.	Compute size of disposal system requirements	E6.24.4
5.	Draw the sewage disposal system to scale	E6.24.5
6.	Define terminology	E6.24.6
V.	Planning and Managing Land Usage	
	Formulate the agricultural land-use section of a comprehensive plan for community development	P7.12
1.	Determine components of land-use section of plan	E7.12.1
2.	Collect information and data for section of plan	E7.12.2
3.	Determine format for reporting information	E7.12.3
4.	Describe procedure for holding public hearings	E7.12.4
5.	Prepare draft of agricultural land-use section	E7.12.5

VI. Managing Fish and Wildlife

A.		Operate a game animal checking station during hunting seasons	P8.14
	1.	Determine the requirements for operating a game animal checking station	E8.14.1
	2.	Describe game laws in specific terms	E8.14.2
	3.	Examine game at checking station	E8.14.3
	4.	Record required information	E8.14.4
	5.	Report unusual circumstances to proper authority	E8.14.5
	6.	Keep records accurate and up-to-date	E8.14.6
B.		Measure wildlife population	P8.15
	1.	List methods for measuring wildlife population	E8.15.1
	2.	List advantages and disadvantages of each	E8.15.2
	3.	Select method(s) appropriate for counting species	E8.15.3
	4.	Define terminology	E8.15.4
	5.	Apply mathematical skills	E8.15.5
C.		Demonstrate ability to manage wildlife	P8.16
	1.	Inventory available feed	E8.16.1
	2.	Determine balance of animals to food supply	E8.16.2
	3.	Determine physical condition of wildlife	E8.16.3
	4.	Evaluate wildlife habitat	E8.16.4
	5.	Recommend stocking procedures	E8.16.5
	6.	Apply mathematical skills	E8.16.6
D.		Report on the control of diseases and parasites in game animals	P8.17
	1.	List diseases and parasites	E8.17.1
	2.	Describe symptons	E8.17.2
	3.	Identify control measures	E8.17.3
	4.	Devise preventive measures	E8.17.4
E.		Describe establishment of a wildlife preserves area	P8.18
	1.	Define terms	E8.18.1
	2.	Determine need	E8.18.2
	3.	Explain procedure to inspect site	E8.18.3
	4.	Describe ways to identify boundaries	E8.18.4
	5.	Develop a plan for security	E8.18.5
	6.	Explain duties of manager	E8.18.6

- F. Develop recommendations to conduct a wildlife control program P8.19
    1. Determine need/practicality of wildlife programs E8.19.1
    2. List damaged caused by wildlife E8.19.2
    3. Determine if problem is short or long term E8.19.3
    4. Relate legal status of animal E8.19.4
    5. Identify control measure E8.19.5
    6. Keep records E8.19.6
- G. Supervise operation of equipment and facilities for plant life projects P8.20
    1. Make necessary recommendations E8.20.1
    2. Provide technical assistance in tree/shrub planting E8.20.2
    3. Supervise preparation of seed beds E8.20.3
    4. Identify particular habitats of local fauna E8.20.4
    5. Plant or maintain food/cover for particular species E8.20.5

VII. Controlling and Preventing Forest Fires

- A. Lay out a plan to mop up a fire P10.6
    1. Determine fire location and area to be mopped up E10.6.1
    2. Assess needed resources E10.6.2
    3. Identify available resources E10.6.3
    4. Set a schedule and procedure for crews E10.6.4
    5. Explain need for revegetation/reforestation E10.6.5
    6. Apply mathematical skills E10.6.6
- B. Complete the Forest Service fire report P10.7
    1. List primary causes of a fire E10.7.1
    2. List legal restriction applying to investigating forest service officer E10.7.2
    3. Identify accepted fire investigating procedure E10.7.3
    4. Complete a fire report form E10.7.4
    5. Define terminology E10.7.5

VIII. Harvesting Forest Products

- A. Outline procedures for managing harvesting operations P11.12
    1. Identify type of cutting E11.12.1
    2. Prepare listing of equipment and time table E11.12.2
    3. Determine felling patterns E11.12.3
    4. Identify elements required to supervise work crews E11.12.4
    5. Prepare records E11.12.5
    6. Define terminology E11.12.6
    7. Apply mathematical skills E11.12.7

IX. Sawing Logs into Lumber

A.	Demonstrate sawmill safety, including first-aid treatment	P12.1
1.	Protect eyes and ears	E12.1.1
2.	Describe safe handling	E12.1.2
3.	Dress in suitable clothing	E12.1.3
4.	Wear safety equipment	E12.1.4
5.	Remove dangerous materials	E12.1.5
6.	Perform first aid	E12.1.6
7.	Give signals for vacating area	E12.1.7
B.	Demonstrate ability to perform general operation activities	P12.2
1.	Check sources of power	E12.2.1
2.	Identify methods for maintaining working condition of machinery	E12.2.2
3.	Identify methods for maintaining working condition of power system	E12.2.3
4.	Explain the function of all mobile equipment	E12.2.4
5.	Identify the location of fire extinguishers	E12.2.5
6.	Identify the location of fire hoses	E12.2.6
7.	Check fire extinguishers	E12.2.7
C.	Demonstrate ability to operate carriage	P12.3
1.	Demonstrate knowledge of distance and space	E12.3.1
2.	Ride short distances forwards and backwards	E12.3.2
3.	Check rollers and coasters	E12.2.3
4.	Check bearings and fittings	E12.2.4
5.	Check feeding system	E12.3.5
6.	Conduct safety check of work area	E12.3.6
D.	Grade a stack of lumber	P12.4
1.	Identify hardwood/softwood	E12.4.1
2.	Apply grading rules	E12.4.2
3.	Grade softwood	E12.4.3
4.	Identify method of evaluating boards	E12.4.4
5.	Define terminology	E12.4.5
E.	Demonstrate ability to operate circular saw	P12.5
1.	Check teeth for sharpness	E12.5.1
2.	Inspect work area safety	E12.5.2
3.	Demonstrate knowledge of pulley operation	E12.5.3
4.	Examine belts for operation	E12.5.4
5.	Check electrical system	E12.5.5

6.	Maintain flow of logs	E12.5.6
7.	Explain process of feeding logs into saw	E12.5.7
8.	Check for foreign material in work area	E12.5.8
9.	Determine time needed to change saw blade	E12.5.9
10.	Sharpen saw teeth	E12.5.10
11.	Adjust saw	E12.5.11
X.	Managing Recreational Enterprises	
A.	Design recreational enterprise	P13.12
1.	Determine major types of recreational enterprises	E13.12.1
2.	Sketch a rough drawing of design	E13.12.2
3.	Determine management needs	E13.12.3
4.	Identify the capital needs	E13.12.4
5.	Estimate attendance and gross receipts	E13.12.5
6.	Identify labor needs	E13.12.6
7.	Estimate operating costs	E13.12.7
8.	Estimate overhead costs of maintenance	E13.12.8
9.	Prepare an income and expense budget	E13.12.9
10.	Apply mathematical skills	E13.12.10
B.	Identify and plan needed financial backing for recreational enterprise	P13.13
1.	Determine amount of capital to be borrowed	E13.13.1
2.	Develop a cash-flow projection	E13.13.2
3.	Determine loan repayment schedule	E13.13.3
4.	Identify sources of financial backing available to individuals	E13.13.4
5.	Describe sources of financial backing available to municipal governments	E13.13.5
C.	Assist in the formulation and development of interpretive program services	P13.14
1.	Identify characteristics of individuals, families, tours, and organized clubs	E13.14.1
2.	Determine orientation needs	E13.14.2
3.	List goals, objectives, etc.	E13.14.3
4.	Plan for campfire programs, guided walks, etc.	E13.14.4
5.	Identify ways of getting participants involved	E13.14.5
6.	Demonstrate ability to use interpretive aids	E13.14.6
D.	Plan security programs for recreational enterprises	P13.15
1.	List secruity measures	E13.15.1
2.	Identify budget constraints	E13.15.2
3.	Describe applicability of each security measure and compute cost	E13.15.3

E.	Design special features	P13.16
1.	Assess land area and topographical needs	E13.16.1
2.	Determine if safety factors can be incorporated	E13.16.2
3.	Identify number of people to be accommodated	E13.16.3
4.	Develop list of equipment, supplies, materials	E13.16.4
5.	Sketch design of area	E13.16.5
6.	Apply mathematical skills	E13.16.6
XI.	Surveying Land	
A.	Measure and record distances, run compass lines, and identify topographic features	P14.9
1.	Measure and record distances	E14.9.1
2.	Explain how to run compass line	E14.9.2
3.	Relate topographic symbols	E14.9.3
4.	Define terminology	E14.9.4
B.	Complete a surveying job	P14.10
1.	Assemble all required tools and materials	E14.10.1
2.	Determine personnel needs	E14.10.2
3.	Set up equipment and record measurements	E14.10.3
4.	Identify sources/types of errors	E14.10.4
5.	Recheck readings and recordings	E14.10.5
6.	Apply mathematical skills	E14.10.6
7.	Define terminology	E14.10.7
C.	Demonstrate ability to use hand level or engineering level and tape	E14.11
1.	Determine operating procedures by reading owner's manuals	E14.11.1
2.	Identify correct operating procedures	E14.11.2
3.	Apply mathematical skills	E14.11.3
D.	Write legal descriptions of a selected plot of land	P14.12
1.	Identify principles of writing legal descriptions	E14.12.1
2.	List the parts of a description	E14.12.2
3.	Write description using procedure in reference manual	E14.12.3
4.	Define terminology	E14.12.4
E.	Convert English measurement units to metric equivalents, and metric equivalents to units	P14.13
1.	Determine how to read chart correctly	E14.13.1
2.	Apply mathematical skills	E14.13.2
3.	Define terminology	E14.13.3

	F.	Perform land line location and corner restoration work	P14.14
	1.	Secure written documents and maps	E14.14.1
	2.	Run lines and corners	E14.14.2
	3.	Establish lines and corners	E14.14.3
	4.	Define terminology	E14.14.4
	5.	Apply mathematical skills	E14.14.5
XII.	Constructing and Maintaining Facilities		
		Maintain and operate water treatment plants, wells, swimming pools, and chlorine systems	P15.11
	1.	Complete all forms and reports	E15.11.1
	2.	Inspect equipment, tools, etc.	E15.11.2
	3.	Perform cleaning operations	E15.11.3
	4.	Demonstrate service and maintenance function	E15.11.4
	5.	Conduct chemical tests	E15.11.5
XIII.	Operating Vehicles and Equipment		
		Demonstrate ability to operate vehicles and equipment	P16.4
	1.	Explain general safety rules	E16.4.1
	2.	Demonstrate knowledge of operator's manual	E16.4.2
	3.	Describe starting procedures and operating controls	E16.4.3
	4.	Determine proper and improper functioning	E16.4.4
	5.	Perform necessary adjustments under field conditions	E16.4.5
	6.	Determine capabilities of vehicles and equipment	E16.4.6
	7.	Define terminology	E16.4.7
XIV.	Maintaining Vehicles and Equipment		
	A.	Demonstrate ability to maintain vehicles and equipment	P17.6
	1.	Identify general safety rules	E17.6.1
	2.	Demonstrate knowledge of operator's manual	E17.6.2
	3.	Describe maintenance procedures	E17.6.3
	4.	Secure needed supplies and parts	E17.6.4
	5.	Perform needed maintenance requirements	E17.6.5
	6.	Identify specific safety rules	E17.6.6
	7.	Define terminology	E17.6.7
	8.	Apply mathematical skills	E17.6.8

XV. Implementing Safety Practices

Explain method of investigating accidents

1. Identify accidents requiring further investigation E19.7.1
2. Describe rules of an agency for investigating accidents E19.7.2
3. Explain legal aspects E19.7.3
4. Demonstrate ability to complete agency reporting forms E19.7.4
5. Maintain appropriate records E19.7.5

XVI. Securing Natural Areas

A. Demonstrate ability to apprehend violators and take appropriate action P20.2

1. Determine which law was violated E20.2.1
2. Describe the procedures to follow E20.2.2
3. Identify situations requiring additional help E20.2.3
4. Demonstrate ability to complete necessary paperwork E20.2.4

B. Explain procedure for preparing cases for prosecution P20.3

1. Identify evidence to obtain for legal action E20.3.2
3. Describe process of obtaining/serving warrants E20.3.3
4. Explain importance of consulting a legal opinion E20.3.4

C. Interpret fish and game laws P20.4

1. Explain fish and game laws to individuals and groups E20.4.1
2. Identify applicable law in case study E20.4.2
3. Paraphrase an appropriate course of action for enforcement E20.4.3
4. Define terminology E20.4.4

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APPENDICES

APPENDIX A--Books and Selected Teaching Materials

APPENDIX B--Audiovisual Materials

APPENDIX C--Publishers' Addresses

APPENDIX D--Additional Equipment and Tools

APPENDIX A

BOOKS AND SELECTED TEACHING MATERIALS

The collection and utilization of instructional resources such as reference books, films, slides, and transparencies are valuable sources of information for the teacher and curriculum developer. These materials are useful in developing instructional materials and providing instructional activities.

This section includes a listing of reference books and audiovisual materials which have been identified by teachers as useful in developing competency-based instructional course material.

BOOKS

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U.S. Department of Labor. Bureau of Labor Statistics. Occupational Outlook Handbook. Bulletin 2075. Washington, D.C.: Government Printing Office, 1980.

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TEACHING MATERIALS

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Agricultural Surveying. Urbana, Illinois: Vocational Agriculture Service.

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Applying for a Job. Urbana, Illinois: Vocational Agriculture Service.

Applying Pesticides. Athens, Georgia: American Association for Vocational Instructional Materials.

Building Fences. Athens, Georgia: American Association for Vocational Instructional Materials, 1974.

Choosing Your Work. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, 1977.

Concrete Improvements for Farm and Home. Urbana, Illinois: Vocational Agriculture Service.

Controlling Tree and Shrub Insects. Urbana, Illinois: Vocational Agriculture Service.

Controlling Weeds. Urbana, Illinois: Vocational Agriculture Service.

Fertilizing and Watering Shade and Ornamental Trees. Urbana, Illinois: Vocational Agriculture Service.

Determining Probable Soil Losses in Conservation Farming. Urbana, Illinois: Vocational Agriculture Service.

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Student Guide and Text
Unit I The Fire Environment
II Fuels Classification
III Topography and Fire Behavior
IV Temperature-Moisture Relationship
V Fuel Moisture
VI Local and General Winds
VII Atmospheric Stability and Instability
VIII Keeping Current With the Weather
IX Extreme Fire Behavior
X Fire Behavior Affects Fireline Tactics
XI Fire Behavior Predictions

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APPENDIX B

AUDIOVISUAL MATERIALS

I. American Association for Vocational Instructional Materials, 120 Driftmier Engineering Center, Athens, Georgia 30602.

Slides or Filmstrips

A. Applying Pesticides

B. Developing Shop Safety Skills

C. Electrical Wiring

D. Understanding Electricity and Electrical Terms

II. Boise Interagency Fire Center, Division of Training, 3905 Vista Avenue, Boise, Idaho 82705.

A. Introduction to Fire Behavior

B. Atmospheric Stability and Instability

C. Man Against Fire

D. Crew Boss

E. Fire Weather

F. Water on the Fire

G. Handtools for Wildfire

H. Standards for Survival

I. Your Way Out

III. Career Aids, Inc., 8950 Lurline Avenue, Dept. K 456, Chatsworth, California 91311.

Filmstrips with Casettes

A. Getting a Job Series

1. Preparing for a Job
2. The Help-Wanted Ads
3. Applying for a Job
4. The Job Application Form
5. The Job Interview

B. Me and Jobs Series

1. What Do I Have That a Job Needs?
2. The Job Environment and Me

B. 3. Want Ads
   4. Application Forms
   5. Job Interview Skills

C. Oral Communication Series

   1. Talking and Listening
   2. Listen and Learn
   3. Talk Better and Get Ahead

D. Job Attitudes and Habits Series

   1. A New World: The Job World
   2. You and Your Job Attitudes
   3. You and Your Job Habits
   4. You and Your Bosses
   5. You and Your Co-Workers

IV. Commission of Game and Inland Fisheries, 4010 W. Broad Street, Richmond, Virginia 23230.

Films

A. Before You Hunt

B. Do It Right

C. Prescription for Boating Safety and Pleasure

D. Whitewater Primer

V. Fearon Pitman Publishers, Inc., 6 Davis Drive, Belmont, California 94002.

Simulated cash register drawer

The CA$HBOX

VI. Gregg/McGraw-Hill, Princeton Road, Highstown, New Jersey 08520.

Game

Paying Your Way

VII. Ohio Agricultural Education Curriculum Materials Service, Room 254, 2140 Fyffe Road, The Ohio State University, Columbus, Ohio 43210-1099.

Slides with script

A. Annuals

B. Concrete Masonry

VII. Slides

A. Lawn Renovation and Reestablishment

B. Mr. Quality Concrete

C. Timber Cruising

D. Tree Identification

VIII. Virginia Department of Agriculture and Consumer Services, P.O. Box 1163, 1100 Bank Street, Washington Building, Capital Square, Richmond, Virginia 23209.

Filmstrip

Agricultural Career Opportunities

IX. Virginia Department of Education, Division of Vocational Education, Agricultural Education Service, P.O. Box 6Q, Richmond, Virginia 23216.

Filmstrip

Virginia's Forests--Careers in Forestry

X. Vocational Agriculture Service, University of Illinois, 434 Mumford Hall, Urbana, Illinois 61801

Slidefilms

A. Agriculture and Ecosystem

B. Agriculture and the Environment

C. Air Pollution Damage to Vegetation

D. Applying for a Job

E. Calibrating and Applying Pesticides Safely

F. Erosion, Sedimentation, and Environmental Quality

G. Lawn Weeds--Identification and Control

H. Pruning Deciduous Shrubs

I. Pruning Evergreens

J. Pruning Flowering Trees

K. Recording Field Notes for Surveying

L. Selecting and Handling Pesticides

M. Using the Level in Farm Surveying

X. N. Using the Steel Tape in Surveying

O. Vegetation Control as an Aid to Environmental Quality

P. Weed Identification

XI. Vocational Education Productions, California State Polytechnic College, San Luis Obispo, California 93407.

Filmstrips (most with Cassettes)

A. Agricultural Credit

B. Careers in Agriculture Series

1. Agricultural Production
2. Agricultural Products
3. Agriculture Resources
4. Environmental Protection
5. Equipment and Mechanics
6. Forestry
7. Ornamental Horticulture
8. Supplies and Services

C. The Chain Saw and Other Harvesting Tools

D. Ecology and Agriculture Kit

1. Ecology and the Agricultural Environment
2. Soil and the Agricultural Environment
3. Water and the Agricultural Environment
4. Air and the Agricultural Environment
5. People and the Agricultural Environment

E. Fish Farming in the '80s Series

1. Modern Fish Farms
2. Fish Health Management

F. Game Bird Management Kit

1. An Introduction to Game Birds
2. Brooding

G. Hand Tools of the Fire Control Forester

H. Managing Wildlife: Is It For You?

I. Oxy-Acetylene Welding Kit

1. Oxy-Acetylene Welding: Setting Up the Equipment
2. Oxy-Acetylene Welding: Flat Position Welds

J. Resource Law Enforcement

K. School Shop Safety

APPENDIX C

PUBLISHERS' ADDRESSES

Agricultural Education Program
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia 24061

Allyn and Bacon, Inc.
470 Atlantic Avenue
Boston, Massachussetts 02210

American Association for Vocational
Instructional Materials
120 Engineering Center
Athens, Georgia 30602

The Associated Press and
Prentice-Hall Media
Tarrytown, New York 10591

Boise Interagency Fire Center
Attention: Administrator
Division of Training
3905 Vista Avenue
Boise, Idaho 83705

Career Aids, Inc.
8950 Lurline Avenue
Department V12
Chatsworth, California 91311

Center for Occupational Curriculum
Development
P.O. Box 7218
The University of Texas at Austin
Austin, Texas 78712

Chicago Mercantile Exchange
444 West Jackson Boulevard
Chicago, Illinois 60606

Cooperative Extension Service
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia 24061

Delmar Publishers
50 Wolf Road
Albany, New York 12205

Department of Labor and Industry
P.O. Box 12064
Richmond, Virginia 23241

Doane Agricultural Service, Inc.
8900 Manchester Road
St. Louis, Missouri 63144

Forest Farmer Association
P.O. Box 95385
4 Executive Park East, NE
Atlanta, GA 30347

Forest Products Laboratory
Forest Service
U.S. Department of Agriculture
P.O. Box 5130
Madison, WI 53705

Gregg/McGraw-Hill
Princeton Road
Hightstown, New Jersey 08520

IAVIM Center
208 Davidson Hall
Iowa State University
Ames, Iowa 50011

Industrial Commission of Virginia
P.O. Box 1794
Richmond, Virginia 23714

Institute of Labor Relations
University of California
Berkeley, California 94700

Instructional Materials Center
(see Center for Occupational
Curriculum Development)

Instructional Materials Laboratory
10 Industrial Education Building
University of Missouri-Columbia
Columbia, Missouri 65211

The Interstate Printers
and Publishers, Inc.
19-27 North Jackson Street
Danville, Illinois 61832

John Deere Service Publications
Department F
John Deere Road
Moline, Illinois 61265

John Wiley & Sons, Inc.
One Wiley Drive
Somerset, New Jersey 08873

Library Filmstrip Center
3033 Aloma
Wichita, Kansas 67211

MacMillan Publishing Company, Inc.
866 3rd Avenue
New York, New York 10017

Modern Talking Picture Service
5000 Park Street North
St. Petersburg, Florida 33709

National Association of
Conservation Districts
408 East Main Street, Box 855
League City, Texas 77573

National Audubon Society
Nature Center Planning Division
1130 Fifth Avenue
New York, New York 10028

Newspaper Advertising Bureau, Inc.
485 Lexington Avenue
New York, New York 10017

Ohio Agricultural Education Curriculum
Materials Service
Room 254, 2120 Fyffe Road
The Ohio State University
Columbus, Ohio 43210

Prentice-Hall, Inc.
Box 500
Englewood Cliffs, New Jersey 07632

Prentice-Hall Media
150 White Plains Road
Tarrytown, New York 10591

Reston Publishing Company, Inc.
11480 Sunset Hills Road
Reston, Virginia 22090

Soil Conservation Society of America
7515 Northeast Ankeny Road
Ankeny, Iowa 50021

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Tennessee Valley Authority
Office of Public Information
400 Commerce Avenue
Knoxville, Tennessee 37902

U.S. Department of Labor
Bureau of Labor Statistics
Information Office--Room 1539
441 G Street, N.W.
Washington, D.C. 20212

U.S. Department of Labor
Employment and Training
Administration
Room 10225
601 D Street, N.W.
Washington, D.C. 20213

U.S. Department of Labor
Wage and Hour and Public
Contracts Division
Washington, D.C. 22004

U.S. General Services
Administration
National Audiovisual Center
Washington, D.C. 20409

Venard Films, Ltd.
Box 1332
Peoria, Illinois 61654

Virginia Department of Agriculture
and Consumer Services
203 North Governor Street
Richmond, Virginia 23209

Virginia Department of Education
P.O. Box 6Q
Richmond, Virginia 23216

Vocational Agriculture Service
College of Agriculture
University of Illinois
434 Mumford Hall
Urbana, Illinois 61801

Vocational Education Productions
California State Polytechnic
College
San Luis Obispo, California 93401

Vocational Instructional Service
Texas A & M University
College Station, Texas 77843

APPENDIX D

ADDITIONAL EQUIPMENT AND TOOLS

Service: Agricultural Education   Program: Natural Resources Management

(The following list of equipment and tools is in addition to that needed for teaching Agricultural Production. Refer to National Resources Management Curriculum Guide for Agricultural Education, 1972, for recommended quantity and specifications.)

I. Essential items of equipment, tools/apparatus/supplies, and education media for program approval.

A. Equipment

- Bars, planting
- Binoculars
- Blower, power mist
- Borer, increment and case
- Brooders
- Clinometer with case
- Gun, tree marking
- Hand shears
- Harvesting equipment
- Incubator
- Injector, tree
- Level, abney with case
- Level and stachia rod
- Maps
- Mattock
- Planting bar pruners
- Prism, cruising
- Reel and chain tape
- Small engine tool set
- Saw, chain
- Saw, crosscut
- Saw, pole
- Saw, pruning
- Saw, saber
- Seeder, cyclone
- Shovel
- Sieve
- Tree caliper

B. Tools/Apparatus/Supplies

- Aerator
- Air compressor
- Auger, soil
- Axe, bush
- Axe, single bit
- Axe, double bit
- Back pack pump
- Bag, planting
- Bows and arrows
- Brushhook
- Building, storage (small aluminum siding building)
- Calculator
- Camera
- Chisels
- Cleaning tools
- Compass, hand
- Compass, surveying & staff
- Compost bin
- Concrete supplies/tools
- Ear muffs, safety
- Electric drill
- Electrical fixtures
- Equipment drives and supplies
- Fertilizer
- Files and rasps
- Files, chainsaw
- Fill materials
- Fir brook
- First aid kit
- Fish eggs
- Flagging, plastic
- Flashlight
- Gauge, bark
- Gauge, basal area angle
- Goggles
- Grids, acreage
- Growing mediums
- Grinder
- Guards, shin
- Hammer, increment and case
- Hand lens
- Hand level (abney)
- Hard hat
- Helmets, head caps
- Herbicide application equipment
- Hoe
- Hook, cant
- Increment borer
- Irrigation equipment
- Inventory-taking equipment
- Kit, snake bite

B. Tools/Apparatus/Supplies (continued)

- Kit, soil test
- Lawn rollers
- Level
- Lumber for grading
- Magnifier, pocket
- Masonry tools/supplies
- Meter, talley
- Microscope
- Mirror, hand
- Mounts for plant samples
- Mower, reel & rotary
- Mulch
- Paddles, tree marking
- Paint, tree marking
- Painting supplies and tools
- Peavy (solid socket)
- Photographs, aerial (obtain locally)
- Planting supplies/tools
- Plants
- Plaster of paris
- Play money
- Pliers
- Plumbing supplies/tools
- Powder, tree marking
- Pruning equipment
- Pulaski
- Rake
- Rule, lumber
- Ruler
- Safety equipment
- Safety signs
- Samples of polluted air & water
- Sampling net (or tea strainer)
- Sandpaper
- Sawmill carriage
- Scale, tree and log
- Screwdriver
- Seeds
- Soil Conservation Service recommendations
- Soil preparation equipment
- Soil samples
- Specimens
- Steel toe boots
- Stereoscope, pocket model
- Stick, biltmore
- Tally boards
- Tally sheets
- Tamper
- Tape recorder
- Tape, tree diameter
- Tape, two chain
- Telephone
- Telephone directories
- Torch
- Tree marker, chalk
- Typewriter
- Video-tape player/recorders
- Weatherstation equipment
- Wedges
- Wheelbarrow
- Wirenuts
- Wrenches

C. Educational Media

- Bulletin boards
- Case studies
- Charts
- Checklists
- Copies of inventories
- Displays
- Field inspection report forms
- Films
- Filmstrips
- Financial statements
- Grading rules
- Income tax guides
- Manuals
- Maps
- Models
- Newspapers
- OSHA regulations
- Payroll forms and literature
- Periodicals
- Reference books (maximum 5 copies each)
- Sample budgets
- Sample employee contracts
- Slide sets
- Transparency sets

Good judgment should be used in making available a variety of up-to-date audiovisual materials in a quantity sufficient for the teacher to provide for individual needs in a competency-based system.

C. Education Media (continued)

One copy of the Natural Resources Management Curriculum Guide distributed by the Agricultural Education Service must be available to each teacher. Reference books or manuals pertaining to instruction in Natural Resources Management must be available.

II. Supplementary basic items of equipment, tool/apparatus/supplies, and education media eligible for reimbursement.

(Same as Agricultural Production)

Service Agricultural Education

Programs Exploratory Agriculture
Agricultural Science & Mechanics
Agricultural Production

(For recommended quantity and specifications, refer to Tool and Equipment List for Exploratory Agriculture and Agricultural Science and Mechanics, 1978 and Inventory of Tools and Equipment for a Department of Agricultural Education.)

I. Essential items of equipment, tools/apparatus/supplies, and education media for program approval.

A. Equipment

Air compressor
Anvil w/ stand
Bars, pry and wrecking, set
Bits, drill, sets
Box, mitre
Brace & bit set
Chisels, cold set
Chisels, wood set
Clamps "C" set
Cold metal hand tool sets
Cutters, bolt, pipe, glass
Drawing kit
Drills presses, wood & metal
Drills, hand electric
Extinguishers, fire
Electrical teaching cabinet
Electrical kits, 1, 2, 3, & 4
Files, set
Furnace, heat treating
General hand tool sets (fencing)
Grinders, portable and pedestal
Hammers, set
Home plumbing hand tool sets
Hot metal hand tool set
Iron, soldering
Jointer
Ladder, step
Masonry hand tool sets
Monitor, safety glasses
Painting & glazing tool set
Planer
Planes, hand
Pliers, sets
Punches, sets
Rules, sets
Saws, hand sets
Saws, metal power hack
Saws, band wood
Saws, portable circular saw
Saws, tilting arbor
Saws, hack hand
Screwdriver, sets
Set, handsaw
Small engine, tool sets
Soldering 7 sheet metal hand tool sets
Sprayer
Squares, set
Stamps, set
Tachometer
Tap & die set
Tool fitting hand tool sets
Torches, carbon arc
Tractor maintenance hand tool sets
Vises, wood, metal, and pipe
Welders, arc
Welders, oxygen-acetylene
Welders, spot
Welding, cylinder truck
Welding, accessories, sets
Welding booth
Woodworking hand tool sets
Workbenches, wood and metal
Wheelbarrow
Wrenches, sets including open end, box end, combination, socket, allen, adjustable, and pipe

B. Tools/Apparatus/Supplies

Awls
Battery service tools, set
Bob, plumb
Brushes, paint set
Cans, safety
Card file
Chains, towing
Dividers
Drain pan
Dresser, grinding wheel
Drills, hand
Edger, concrete
Extention cords
Flaring tool
Floats
Fire blankets
Funnels
Gloves, welders
Groover, concrete
Guns, grease
Hatchet
Hose, garden
Lights, timing and trouble
Magnet, pick up
Oilers
Pullers, gear and wheel
Rasps
Reamer
Respirators
Scissors
Scrapers
Shields, face
Shovels
Snips
Stencils, set
Stones, oil
Stripper, electric wire
Surform
Tester, anti-freeze and current
Thread, chaser, spark plug
Threader, pipe
Tongs
Trowels
Tube bender
Tube cutter
Valve tool

C. Educational Media

Charts
Displays
Films
Filmstrips
Manuals
Models
Reference books (maximum 5 copies each)
Safety signs & tape
Specimens
Slide sets
Transparency sets

Good judgment should be used in making available a variety of up-to-date audio-visual materials in a quantity sufficient for the teacher to provide for individ-ual needs in a competency-based system.

One copy of Agricultural Science and Mechanics I and II--A Curriculum Guide for Agricultural Education and Agricultural Production--A Curriculum Guide for Agricultural Education distributed by the Agricultural Education Service must be available to each teacher. Reference books or manuals pertaining to instruction in Agricultural Science and Mechanics and/or Agricultural Production must be available.

D. Instructional Supplies (examples of expendables)

- Bolts, nuts & washers
- Acetylene gas
- Electrodes
- Welding rods
- Oxygen
- Propane gas
- Nails
- Screws
- Lumber
- Bulbs
- Seed
- Fertilizer
- Paper
- Sandpaper
- Paint
- Varnish
- Chalk
- Tally sheets
- Glues
- Polish
- Brushes
- Tape
- Tacks
- Soil
- Soil conditioners
- Plants
- Cleaning compounds
- Solder
- Metal
- Pipe

II. Supplementary basic items of equipment, tools/apparatus/supplies, and educational media eligible for reimbursement.

A. Equipment

AVR Tester
Battery charger
Battery starter tester
Cleaner, steam or high pressure
Combination analyzer
Crane, portable hydraulic
Creeper
Current indicator
Dust collector system
Engraver, electric
Engine analyzing equipment
Engine stands
Engines, small gasoline
Fume removal system
Greenhouse
Hoist
Ignition tester
Jack, hydraulic
Levels
Lathe, wood w/ tools & plates
Micrometers, set
Mixer, concrete
Parts, washer
Sander, portable
Saw, radial arm
Saws, chain
Shear, lever
Sprayers, paint
Simulator
Tractor w/ equipment
Truck
Welders, mig
Welders, tig

B. Tools/Apparatus/Supplies

1. Agricultural Engineering

Drawing board, basswood 17" x 22"
Drawing set
Scale (architect molded plastic)
Triangles 30°, x 60°, 45°,
Protractor
Triangle scale, 12"
Drawing compass
Surveying chain w/ reel
Surveying chain w/ out reel
Farm level, telescopic & tripod

2. Agricultural Crops

Acid test kit
Soil test kit
Sieves for grading seed
9" x 9", set of 12
Soil auger, 40" long
Soil thermometer
Seed threader
Grain judging trays

3. Forestry

Auger, soil
Axe, bush
Axe, single bit
Axe, double bit
Bag, planting
Bars, planting
Borer, increment & case
Clinometer w/ case
Compass, hand
Compass, surveying & staff
Flagging, plastic
Grids, acreage
Goggles
Gauge, bark
Gauge, angle
Guards, shin
Gun, tree marking
Hammer, increment case
Helmets, head caps
Hook, cant
Injector, tree
Kit, soil test
Level, abney case
Level & stadia rod
Magnifier, pocket
Meter, tally

3. Forestry (continued)

Paddles, tree marking
Peavy (solid socket)
Powder, tree marking
Prism, cruising
Reel & chain tape
Saw, chain
Rule, lumber
Saw, pole
Saw, pruning
Scale, tree & log
Seeder, cyclone
Shears, Christmas tree
Steroscope, pocket
Stick, biltmore
Tally boards
Tape, tree diameter
Tape, two chain
Tree marker, chalk

4. Horticulture (Ornamental)

Brooms, street
Dusters, knapsack
Edgers, lawn
Hoes
Knives
Rakes, lawn
Rakes, garden (steel)
Grass shears
Pruning shears
Nursery spades
Sprayer, knapsack, 3 gal.
Sprayer, hand
Spreader, lime
Wheelbarrows
Crowbar, combination 6'
Digger, post, long handle
Hoses, water 200 ft. 3/4"
Knives, budding No. 716
Shovels, rd. pt. L. H.
Shovels, sq. pt. L. H.
Shovels, rd. pt. S. H.
Shears, pruning S. N.
Shears, grass 6"
Shears, pruning L. H.
Snips, pruning
Saw, pruning 20"
Saw, L. H. 12"
Hedge clipper
Hedge clipper, electric 16"
Grass hooks
Mattocks
Picks
Forks, L. H.
Trowels, plant
Lattern (wax melter)
Tree trimmer 12'
Sprinkling cans, 2 gal

5. Horticulture (Orchard & Garden)

Tree trimmer, 1 1/8" x 1 1/4" - 10
Pruning saw, tapered 14"
Pruning knife, 4"
Grafting wax, hand grafting wax (1 lb.)
Tree scraper
Fruit picker, metal frame, cloth bag
Fruit picking bag, heavy duck
Pruning shears, hand, 10"
Lopping shears, tree pruner
Budding knife, 4" beveled blade
Spray, garden
Duster, garden

6. Bee Production

Hive, standard or all
Supers, shallow
Cover, metal or wood
Queen, excluder, 3-wire standard
Bee escape, double
Hive base, cypress
Honey extractor (centrifugal)
Comb knife
Veil, clear vision
Smoker
Hive tool, steel, 8" or 10"
Foundation comb, 3-ply
Brood frame, wood or metal spaced
Honey sections
Queen trap, wire
Inner cover, improved

7. Dairy Production

Milk pail, seamless small top
Mile strainer, seamless dome, cotton disk
Milk scales, 60 lb.
Pipe line scales
Milk bottle brush
Mastitis detector blotters
Mastitis test kit
Strip cup, tray type
Horn file, 10"
Horn scraper, removable blade, 10"
Anti-kickers, adjustable
Bull lead staff, 5'
Marking comb, steel
Milk fever outfit
Cleaning brush, cattle cleaning
Electric clippers
Babcock testers, & accessories
Whole milk test bottle, 18 gr., 6-1/2"
Skim milk test bottle, 6-1/2"
Cream test bottle 9 gr., 6-1/2"
Milk test pipette
Cream test pipette
Acid measure
Milk test bottle brush
Cream test bottle brush
Milk pipette brush
Bottle case, capacity 24 bottles
Thermometer, dairy, 8", 30-200 F.
Dividers
Test bottle bath & rack, 24 bottle-steel tank
Stone jar, 3 gal.

8. Livestock Production

Show halter, leather
Show stick, show lead
Burdizzo dehorner
Dehorner (a) convex, (b) barnes, (c) tube, (d) electric
Emasculators
Castrating knife
Elastrator
Metal syringe, 4 oz. long type, 3 ring
Balling gun
Set vaccinating instruments
Artery forceps
Capsule gun
Jaw spreader
Hand clippers, 11-1/2"
Ear marker, V-shaped
Hog rings and pincers
Pig teeth nippers, 6-1/2"
Trocar and canula, 5-1/2" metal handle
Horn weights, adjustable
Tattoo set
Branding sets
Livestock scale
Meat thermometer
Farrier equipment
Livestock chute
Electric groomer

9. Poultry Production

Egg scales
Egg candler, heavy leather, cushion at opening
Egg basket, wire
Fowl catcher, hook end 45"
Antigen test box
Poultry marker, tattoo 5 letter
Debeaker and wing clipper
Band applicator, metal
Time control
Chicken sticker
Caponizing set
Dissecting set
Vaccinator
Exhibition coops, wire 24" sp. double

10. Laboratory and Miscellaneous

Alcohol lamp, 8 oz., 1/4" wick
Household scales
Tripod magnifiers
First aid cabinet

11. Office and Classroom Equipment

Movie projector, 16 mm
Projection table
Filmstrip & record player combination
Slide and filmstrip projector
Slide projector
Screens
Overhead projectors
Copy machines for transparencies
Tables, 2 pupil
Chairs, pupil
Desk, teachers
Rack, magazines
Typewriter
4-drawer file
Map and chart file
Adding machine
Postage scale
Desk, secretary
Desk, office
Chairs
File basket
Duplicator, mimeograph
Recorder, tape
Recorder, video
Lettering equipment for signs

C. Educational Media

Disease specimens (plant)
Feed samples
Fertilizer samples
Films
Film strips
Grain samples
Insect specimens
Reference books (maximum 5)
Reference manuals
Record books
Safety signs
Slide sets
Transparency sets
Weed samples

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